Mid-IR emission of galaxies in the Virgo cluster III. The data[★]

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Abstract. We present ISOCAM imaging data at 6.75 and 15 μm for 145 galaxies in the Virgo cluster and in the Coma/A1367 supercluster. Of these, 99 form a complete, optically-selected, volume-limited sample including galaxies in the core and in the periphery of the Virgo cluster, suitable for statistical analysis. 34 of the Virgo galaxies were resolved by ISOCAM: for these objects we present mid-IR images, radial light and colour profiles, as well as effective and isophotal radii, surface brightness and light concentration indices.

The mid-IR colours of the target galaxies show a weak trend with the H band luminosity, with values of $F(6.75 \mu\text{m})/F(15 \mu\text{m}) \geq 1$ found generally in massive objects ($L_H \geq 10^{10} L_{H\odot}$), and $F(6.75 \mu\text{m})/F(15 \mu\text{m}) \leq 1$ in low-mass ($L_H \leq 10^{10} L_{H\odot}$) dwarf galaxies. All early-type galaxies (type $\leq$ S0a) have $F(6.75 \mu\text{m})/F(15 \mu\text{m}) \geq 1$, as expected when the mid-IR emission is dominated by the photosphere of the cold stellar population. The mid-IR, near-IR and visible light concentration indices of bright galaxies are tightly correlated with one another, indicating that the spatial distribution of the mid-IR emitting sources is, to the first order, similar to that of the stars.

Key words. galaxies: general – galaxies: spiral – galaxies: ISM – stars: formation

1. Introduction

Interstellar dust plays an important role in the energy balance of galaxies. Dust grains efficiently absorb the stellar light and re-emit the absorbed energy in the infrared. A large fraction of the energy emitted by a galaxy therefore lies in the infrared, ranging from $\sim 30\%$ in normal galaxies such as the Milky Way up to more than 90% in ultra-luminous infrared galaxies (Cox & Mezger 1989).

Observations with the IRAS, COBE and ISO satellites have demonstrated the existence of dust grains with a large range of sizes, from big grains (with a radius $a \gtrsim 200 \text{ \AA}$) to very small grains ($10 \text{ \AA} \lesssim a \lesssim 200 \text{ \AA}$) and even smaller particles responsible for the Aromatic Infrared Bands (AIBs). Depending on the radiation field, these grains are or are not in thermal equilibrium. For example, in the radiation field near the Sun which is typical for an ordinary spiral galaxy, the big grains which contain most of the dust mass are in thermal equilibrium with a

typical temperature of 17.7 K (Lagache et al. 1999). However, there are also colder grains with temperatures as low as ≈ 12 K in regions shielded from visible and UV radiation (Ristorcelli et al. 1999). At the other extreme of the grain size range, the carriers of the AIBs are always heated stochastically by absorption of single photons and temporarily reach very high temperatures, at which most of the emission occurs (Draine & Li 2001). The situation with the intermediate very small grains is more complex, because the size of grains that exhibit stochastic heating and of those that emit at equilibrium temperature depends on the radiation field.

The intensity emitted at frequency ν by grains at temperature T is $I_\nu = \tau B_\nu(T)$, where $B_\nu(T)$ is the specific intensity of the blackbody at temperature T and the optical depth τ is roughly proportional to ν^{-2} . Consequently, the peak of emission for cold grains (12–20 K) is at wavelengths longer than 100 μm . Stochastically heated grains reach temporarily high temperatures, at which most of the energy is radiated, so that the peak of their emission is at much shorter wavelengths. Models for the optical properties of grains consistent with the local dust extinction and emission properties of the Milky Way have been presented in Li & Draine (2001).

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[★] Figures 1 and 2, and Tables 1, 2, 4, 5 are only available in electronic form at <http://www.edpsciences.org>

Such dust models can be used as the basis for self-consistent calculations of grain heating, incorporating realistic geometries, in well-studied late-type galaxies. Such calculations show for example that at $60\ \mu\text{m}$, most of the integrated emission of a normal galaxy is not dominated by very small grains, as is the case for the emission from grains immersed in the interstellar radiation field near the Sun (Dsert et al. 1990; Dwek et al. 1997), but mainly (about 60%) by bigger grains in equilibrium with the high radiation fields in the star-forming regions: see e.g. Fig. 8 and Table 3 of Popescu et al. (2000) for the case of NGC 891. At this wavelength, only about 20% of the emission comes from stochastically heated grains in the outer disks, with approximately another 20% arising from big grains in equilibrium with the diffuse optical photons in the central regions of galaxies.

There is another difficulty, of observational nature, in the interpretation of far-infrared observations of galaxies. The cold grains, which contain most of the mass of the dust, could barely be seen in the $100\ \mu\text{m}$ filter of IRAS, which therefore offered a biased view of dust emission in galaxies. ISO extended the observing wavelength range to $200\ \mu\text{m}$, providing a better insight on this emission and consequently enabling a more complete knowledge of dust emission and energy balance in galaxies (Popescu et al. 2002; Popescu & Tuffs 2002).

To which extent the mid- and far-IR emission can be used as a tracer of star formation in galaxies is still unclear. The far-infrared wavelength range is more favorable a priori, since it carries the bulk of the luminosity re-radiated by grains, most of which arise from the young stellar population. Whether the mid-IR can also be of use is an interesting and still open question, which could be resolved by statistical comparisons of mid-IR data with star formation rates corrected for extinction and derived from a combination of UV/optical and far-IR/submillimeter data. It should be reminded at this stage that the spectral energy distribution of the mid-IR emission in the UIBs and associated continuum does not depend on the intensity of the radiation field, but only on its hardness. This might ease the interpretation of the corresponding observations.

With this aim in mind amongst others, the ISOCAM and ISOPHOT consortia defined a coordinated program of observations of an optically selected, complete sample of late type galaxies, which was executed in the guaranteed time of the ISOCAM and ISOPHOT instrument teams. The sample of Virgo cluster galaxies was chosen because, at that time, it was the deepest complete sample available of normal star-forming galaxies. Most of these galaxies are thought to be freshly falling in from the field, before being affected by the cluster environment. However the sample contains galaxies in the central region that are clearly affected. Roussel et al. (2001b) have presented ISOCAM data for 23 of the brightest Virgo galaxies which add to the present sample. The Virgo sample can be compared to the Coma/A1367 supercluster ISO sample (see later), which is more affected by the environment, and to the samples of nearby field galaxy of the ISO surveys of Dale et al. (2000) and of Bendo et al. (2002).

In this paper we report on the ISOCAM consortium observations at 6.75 and $15\ \mu\text{m}$ and present the results of new reductions made using updated CIA data reduction tools,

i.e. v 4.0. We discuss and analyze the mid-IR properties of late-type galaxies. The PHOT and LWS data are presented in Tuffs et al. (2002) and Leech et al. (1999) respectively, and discussed respectively by Popescu et al. (2002), Pierini et al. (1999, 2001) and Boselli et al. (2002; 2003). The origin of the dust emission of late-type galaxies and its relation with star formation, already presented in Boselli et al. (1997a, 1998), will be discussed further in future papers. We also present homogeneously reduced mid-IR data for other galaxies in the Virgo cluster and in the Coma/A1367 supercluster. The total number of galaxies we discuss is 145. It represents, up to date, the largest available sample in the literature with ISOCAM data.

The samples are presented in Sect. 2, the observations, the data reduction procedures and the image analysis in Sects. 3 and 4. The Mid-IR properties of 34 spatially resolved galaxies are given in Sect. 4. The data are compared to those available in the literature in Sect. 5, while a simple statistical analysis of the mid-IR properties of late-type galaxies is given in Sect. 6.

2. The sample

The present paper reports ISOCAM observations of 123 galaxies in the Virgo cluster region ($12^{\text{h}} \leq \text{RA} \leq 13^{\text{h}}$, $0^{\circ} \leq \text{Dec} \leq 18^{\circ}$) and 22 objects in the Coma/A1367 supercluster region ($11^{\text{h}}30^{\text{m}} \leq \text{RA} \leq 13^{\text{h}}30^{\text{m}}$, $18^{\circ} \leq \text{Dec} \leq 32^{\circ}$).

The present sample can be subdivided in 5 different subsamples, defined as:

- The optically-selected, volume-limited, complete *ISO Virgo sample*, defined as described in Boselli et al. (1997b, 1998), observed in guaranteed time as part of the Virgo central program with CAM, PHOT¹ (Tuffs et al. 2002) and partly with LWS² (Leech et al. 1999). This sample has been extracted from the Virgo Cluster Catalogue (VCC) of Binggeli et al. (1985), which is complete to $B_{\text{T}} = 18$, to include all late-type galaxies (type $\geq \text{S0a}$) with $B_{\text{T}} < 18$, classified as cluster member by Binggeli et al. (1985, 1993). For telescope time limitation, out of the 207 VCC galaxies matching these criteria, only 100 were selected. These are objects with projected separation $< 2^{\circ}$ from M 87 (cluster core) or at the periphery of the cluster, with an angular separations greater than 4° from the position of maximum projected galaxy density given by Sandage et al. (1985), but excluding galaxies within 1.5° of the M 49 sub-cluster. To limit the spread of distances within the sample, galaxies belonging to the M and W clouds (as defined by Binggeli et al. 1985, 1993), and in the Southern extension ($\delta < 5^{\circ}$) were also excluded.

The total sample includes 118 objects (see Boselli et al. 2003). Because of the low visibility of the Virgo cluster during the ISO mission and because of the low detection rate

¹ Sixty-one out of the 100 ISO Virgo sample galaxies (see Sect. 2) were observed by ISOPHOT. These comprise all galaxies west from RA(1950) 12.596 h with B_{T} brighter than 16.8 mag in the cluster periphery and B_{T} brighter than 14.5 mag in the cluster core areas.

² Eighteen out of the 100 ISO Virgo sample galaxies were observed by ISOLWS. These comprise all objects with type $\leq \text{Scd}$ and $B_{\text{T}} \leq 12.3$, with the exception of the interacting system VCC 1673-1676 and VCC 836.

of small galaxies with ISOCAM, the 18 Im and BCDs in the cluster core could not be observed. The resulting sample is still unbiased but includes only 100 objects, with 28 spirals (S0/Sa–Sm) in the cluster core, and 72 spirals, irregulars and BCDs in the cluster periphery. It thus constitutes an optically–selected, volume–limited complete sample, ideal for statistical analyses. 99 out of the 100 galaxies were observed by ISOCAM³. The sample includes galaxies spanning the whole range in morphological type for late-type systems, from S0/a to Im and BCDs, luminosity ($-21 \leq M_B \leq -13$), and galaxy density (cluster core vs. cluster periphery).

- The *Virgo serendipitous sample* is composed of 18 galaxies with optical counterparts in the VCC, serendipitously observed in the field of the ISO Virgo galaxies. This sample is dominated by early-type systems, mostly dwarf ellipticals (10 objects). Despite its small dimension, this subsample can be taken as representative of a mid-IR selected sample of nearby galaxies. Two of the 18 objects (VCC 899 and VCC 1018) are background galaxies.
- Six galaxies belonging to the Virgo cluster were observed with ISOCAM as part of other guaranteed or open time proposals. Out of the 6 objects, only one is not included in the VCC. The ISOCAM data, now available at the ISO data centre, are here reduced, analyzed and presented as homogeneously as possible with those of the ISO Virgo sample providing to the community the largest available dataset of galaxies in the Virgo cluster region. Since the observations of these objects were taken for different purposes, the photometric quality of the present data is not always as good as that of the *ISO Virgo sample*.
- The *A1367 and Coma clusters sample*, extensively described in Contursi et al. (2001), includes 19 late-type galaxies. Briefly, the sample is composed of high star forming galaxies with peculiar morphologies, blue colour indices ($B - H \leq 2.75$), characterized by asymmetric HI and/or H α distributions or indicating any possible sign of an ongoing interaction with the intracluster medium. The present sample is thus not complete in any sense. The CAM data, already presented in Contursi et al. (2001), are here reprocessed using the new data reduction tools and are thus directly comparable to those of the Virgo samples. Data for the serendipitously detected CGCG97-087N are added.
- We present CAM data of other 3 galaxies in the Coma/A1367 supercluster region; two of them (CGCG159-072) form an interacting system, known as “The mice” (Arp 242), the third one (CGCG130-023) is a galaxy in the small group of UGC 8248 (Gavazzi et al. 1999b).

Table 1 gathers the principal information on the target galaxies, arranged as follows:

- Column 1: VCC denomination for the Virgo cluster galaxies (Binggeli et al. 1985, hereafter VCC), CGCG for the objects in the Coma/A1367 supercluster (Zwicky et al. 1961–1968, hereafter CGCG).

- Column 2: UGC name (Nilson 1973).
- Column 3: NGC or IC name.
- Columns 4 and 5: (J2000.0) celestial coordinates with few arcsec accuracy, from the VCC, or measured by us on the DSS.
- Column 6: morphological type, from the VCC or from Binggeli et al. (1993) for Virgo galaxies, from Gavazzi & Boselli (1996) for the other objects.
- Column 7: photographic magnitude from the VCC for the Virgo galaxies, from the CGCG for the other objects.
- Columns 8 and 9: major (*a*) and minor (*b*) optical diameters (arcmin) determined at the surface brightness of 25th mag arcsec⁻². From the UGC (when available) or consistently determined by us. For VCC galaxies the diameter is computed from the “last visible” isophotal diameter given in the VCC using: $\text{Log } a_{\text{ext}}(b_{\text{ext}}) = 0.99 \text{Log } a(b) + 0.1$.
- Column 10: distance, in Mpc. Distances to the various substructures of Virgo are as given in Gavazzi et al. (1999a). A distance of 96 and 91.3 Mpc is assumed for galaxies in Coma and A1367 respectively. For galaxies not belonging to the clusters, the distance is determined from the redshift assuming $H_0 = 75 \text{ km s}^{-1} \text{ Mpc}^{-1}$.
- Column 11: cluster membership as defined in Gavazzi et al. (1999a) for Virgo and in Gavazzi et al. (1999b) for the Coma/A1367 supercluster⁴. Codes A, B, M, W, S, N and E are for clusters A and B, M and W clouds, southern extension, N and E substructures respectively.
- Column 12: projected angular distance from the cluster centre (M 87), in degrees. Among the ISO Virgo galaxies, the core subsample is composed by all objects with $\theta < 2$ degrees.
- Columns 13 and 14: the *K* and *B* band $C_{31}(K)$ and $C_{31}(B)$ concentration index, defined as the model independent ratio between the radii that enclose 75% and 25% of the total light, from Gavazzi et al. (2000) and Gavazzi et al., in preparation.
- Column 15: notes on morphological type, from Boselli et al. (2003) for the ISO Virgo sample, from NED for other objects, unless specified.

3. Observations and data reduction

All galaxies were observed in 2 filters, LW2 ($\lambda = 6.75 \mu\text{m}$, $\Delta\lambda = 5.00\text{--}8.50 \mu\text{m}$) and LW3 ($\lambda = 15.0 \mu\text{m}$, $\Delta\lambda = 12.0\text{--}18.0 \mu\text{m}$).

Observations of the ISO Virgo sample were part of the ISOCAM Central Program: all galaxies were observed in one of the few visibility windows of the Virgo cluster during the ISO mission, in the summer of 1996. The 32×32 pixel long-wavelength camera was used to make a raster map covering the whole pointed galaxy and its nearby background, with a shift (then overlap) of 16 pixels between adjacent positions.

⁴ The Gavazzi et al. (1999a) cluster membership criterion, based on the analysis of the 3-D distribution of galaxies in the Virgo cluster, is slightly different from that used by Binggeli et al. (1985, 1993). It is thus not surprising that several objects in Table 1 appear as members of cluster B or of the M and W clouds.

³ The galaxy VCC 1869, unfortunately not observed by ISOCAM, should be added to these 99 objects to form the exact complete sample.

The pixel size was $6'' \times 6''$, with a diffraction limit of 6 arcsec at $6.75 \mu\text{m}$ and of 8 arcsec at $15 \mu\text{m}$. 3×3 rasters were made for galaxies with the smallest angular dimensions, while larger rasters, up to 8×8 , were adopted for giant or extended objects. The extension of the combined map was selected to exceed by a factor of $\sim 2\text{--}3$ the optical angular dimension of the galaxy in order to allow an accurate determination of the background contribution. All rasters were performed along the satellite axes, which are aligned with the camera axes. This implies that the orientation of the North axis with respect to the raster axes is in principle different from one map to the other. This orientation is listed in Table 4, where the quoted angle is from the North axis to the main scanning axis of the raster (i.e. that on which ghosts due to transients appear). As can be seen there is in fact little dispersion because the observations were performed in a small group of nearby orbits. Table 5 also lists the ISO TDT number which can be useful to locate our observations in the ISO archive⁵. The elementary integration time was 2.1 s, with 16 to 20 integrations per position. To minimize the effects of transients of the detector on the determination of the source flux, 40 to 70 integrations per position were used in the first raster position every time the background was expected to change significantly from the previous target, i.e. for significantly different pointings and for different filters.

The large raster maps allowed us to observe other Virgo galaxies: only those fully covered by the CAM image were included in the Virgo serendipitous sample.

An accurate description of the observations of the A1367 and Coma clusters galaxies is given in Contursi et al. (2001). This program was prepared to follow most of the procedures used in the Virgo galaxy observations. Given the small angular size of the targets, images were obtained by mosaics of 2×2 raster positions with shifts of 10 pixels ($60''$) between successive positions. The final images have sizes of 42×42 pixels, or $4.2' \times 4.2'$. The central 22×22 pixels, containing the galaxy, were sampled 4 times. All observations were done with an elementary integration time of 5.04 s, with ~ 10 integrations per position, 20 for the first raster position.

In order to minimize the overhead time for galaxy pointing and for the stabilization of the detector, galaxies in the ISO Virgo sample as well as in the clusters A1367 and Coma were observed in a concatenated mode, with a complete sequence of observations of 5–10 nearby galaxies in a given (and fixed) filter.

The remaining 6 galaxies in the Virgo cluster as well as the 3 objects in the Coma/A1367 supercluster were part of different and thus heterogeneous observing programs. In particular, only the central region of the three early-type objects in Virgo was mapped, making the determination of the sky emission, and thus of the total flux density, highly uncertain.

Images were reduced following the standard CIA⁶ procedures available at the ISO center at CEA/Saclay: images

were dark-subtracted using a time-dependent model of the dark current (Siebenmorgen et al. 2000), then deglitched using the multi-resolution method described in Starck et al. (1999). Data cubes were then transient-corrected using the algorithm developed by Coulais & Abergel (2000). It is well known that even with this transient correction, there remains in the ISOCAM data a long term drift, called “long-term transient” by Miville-Deschênes et al. (2000) which manifests itself as an increase of the background level as the raster progresses. We have used the methods developed by Miville-Deschênes et al. (2000) to correct for this long-term transient, as well as to flat-field the data, the two corrections being intimately linked. The routines necessary for these corrections are available at CIA, through the SLICE package. Even with these, we often observed a 2-D gradient in the background of the final, reduced images. This gradient was removed using the task IMSURFIT in IRAF/IMAGES⁷. In Sect. 4.1 we come back to the uncertainties introduced by the data reduction process.

The absolute astrometric accuracy of the reconstructed rasters is dominated by the lens wheel jitter which introduces an absolute uncertainty of 1.5–2 pixels, i.e. $9\text{--}12''$. The relative pointing uncertainty, i.e. that which relates to successive pointings inside a raster, is much smaller, at $0''.5$. Given that the observations we made in rather long concatenated chains of rasters, the same absolute astrometric error will apply to the rasters obtained in the same concatenation chain. For the same reason, since the LW2 and LW3 observations were generally made in different chains, a different pointing error occur in the two maps of the same galaxy.

4. Image analysis

The total flux densities were extracted using the QPHOT routine in IRAF/NOAO after subtraction of the sky background estimated in a concentric annulus outside the galaxy, of radius $\sim 20\%$ larger than the mid-IR extension of the galaxy. Total counts have been obtained by integrating the pixel counts over the area covered by each galaxy, as derived by its mid-IR image, i.e. within a circle of radius r_λ , $\sim 10\%$ larger than the isophotal radii $r_5(6.75)$ and $r_5(15)$ as given in Eqs. (5) and (6). Counts were transformed into flux densities using the conversion factors given in the ISOCAM handbook (Siebenmorgen et al. 2000), i.e. by dividing by $2.32 \text{ ADU gain}^{-1} \text{ s}^{-1} \text{ mJy}^{-1}$ for LW2 and $1.96 \text{ ADU gain}^{-1} \text{ s}^{-1} \text{ mJy}^{-1}$ for LW3.

For undetected galaxies, an upper limit has been determined as:

$$F_{\text{limit}(\lambda)} = 2 \sqrt{[\sigma(s)_\lambda (\pi r'_\lambda)^2]^2 + [\sigma(p)_\lambda \sqrt{(\pi r'_\lambda)^2}]^2} \text{ (mJy)} \quad (1)$$

where $\sigma(p)_\lambda$ is the background noise per pixel at a given λ , $\sigma(s)_\lambda$ is the uncertainty on the sky determination and r'_λ is the expected mid-IR radius (in pixel units, 6 arcsec/pixel) of the observed galaxy. r'_λ has been estimated using Eqs. (5) and (6),

⁵ <http://www.iso.vilspa.esa.es/>

⁶ CAM Interactive Analysis, CIA, is a joint development by the ESA Astrophysics Division, and the ISOCAM Consortium led by the ISOCAM P.I., C. Cesarsky, Direction des Sciences de la Matière, CEA, France.

⁷ IRAF is the Image Analysis and Reduction Facility made available to the astronomical community by the National Optical Astronomy Observatories, which are operated by AURA, Inc., under contract with the U.S. National Science Foundation.

determined from the relationship between optical and mid-IR isophotal radii of resolved galaxies (see Sect. 4.2). The upper limit to the flux density corresponds to $2 \times err_\lambda$, where err_λ (see Eq. (4)) would be the total error for the flux density if the galaxy was detected (see Sect. 4.1).

The results of the observations are given in Table 2, organized as follows:

- Column 1: galaxy name.
- Column 2: raster map.
- Column 3: total field of view, in arcminutes.
- Column 4: elementary integration time.
- Columns 5, 6, 7, 8 and 9: mid-IR flux density (in mJy) with error, background surface brightness, uncertainty on the sky determination $\sigma(s)_\lambda$, pixel noise $\sigma(p)_\lambda$ and photometric quality of the data at $6.75 \mu\text{m}$. For galaxies with two independent data reductions (see Sect. 4.1), Col. 5 (and 10) gives the average value. The error is determined using Eq. (4) given in Sect. 4.1. The rms $\sigma(s)_\lambda$ used in the error determination has been computed as the standard deviation on the estimate of the sky background, whose accuracy is limited by the quality of the flat-fielding. This is, on average, a factor of 2 lower than the rms on the single pixel counts $\sigma(p)_\lambda$. The background surface brightness, $\sigma(s)_\lambda$ and $\sigma(p)_\lambda$ are given in units of $\mu\text{Jy arcsec}^{-2}$. A photometric quality of 1 is for high signal to noise images with a flat sky background. A value of 2 is for low signal to noise data, for images with strong residual gradients in the sky background, for objects where the transient memory of the bright nucleus is not perfectly corrected and partly contaminates the disc emission in the reduced image, or for those objects whose photometric parameters differ by more than $\sim 30\%$ when images are reduced using different parameters (see Sect. 4.1). In all these objects the photometric uncertainty is expected to be larger than on the average. A photometric quality of 3 is given to tentative detections. These data should be used with caution in any statistical analysis.
- Columns 10, 11, 12, 13 and 14: mid-IR flux density (in mJy) with error, background surface brightness, uncertainty on the sky determination $\sigma(s)_\lambda$, pixel noise $\sigma(p)_\lambda$ and photometric quality of the data at $15 \mu\text{m}$.
- Column 15: an asterisk indicates notes to individual objects, reported at the end of the table. For the serendipitous Virgo sample, Col. 15 lists the target name of the frame where the galaxy was detected.

The detection rate is 77% and 67% at 6.75 and $15 \mu\text{m}$ respectively for the ISO Virgo sample, 28% and 22% for the Virgo serendipitous sample, and 100% at both frequencies for the other samples. The 6.75 and $15 \mu\text{m}$ gray-level images of the fully resolved galaxies (see Sect. 4.2) are given in Fig. 1, while the contour plot of all the other detected galaxies (with a surface brightness brighter than $2 \mu\text{Jy arcsec}^{-2}$) are shown in Fig. 2.

4.1. Photometric uncertainty

All the possible origins of photometric errors in ISOCAM images are extensively discussed in Roussel et al. (2001b). Those

which are going to affect the present data are mostly related to (1) remnants of transient on the galaxies' nuclei that either decrease the responsivity of the array, or leave ghosts in the map, (2) the use of an incorrect flat-field, (3) an incomplete correction of the long-term transient leading to a wrong assessment of the background. It is not possible to perform statistical tests on point (1) since it would mean changing the parameters of the Coulais & Abergel (2000) model, thus abandoning the physical basis that is its strength. One can only identify on the images the presence of these ghosts and label the fluxes accordingly (see Table 2). For the other effects, it is possible to investigate their amplitude by adjusting the correction parameters. These parameters are in fact mostly those dealing with long-term transient and flat-field corrections.

Inaccurate corrections for the long-term transient and/or for flat-fielding lead to large uncertainties in the sky background determination. These uncertainties are larger than those induced by the statistical noise of the image on extended sources, where are the major sources of error for the flux determination. Inaccurate corrections for long-term transient and/or flat-fielding can introduce 2-D structures on the image background on scale comparable or larger than the angular size of the target galaxies, leading to systematic errors on the sky background. Using the uncertainty on the sky determination ($\sigma(s)_\lambda$) (Cols. 7 and 12 in Table 2), we can compute the error on the flux density determination due to long-term transient and/or for flat-fielding, $err(s)_\lambda$, using the relation:

$$err(s)_\lambda = \sigma(s)_\lambda (\pi r_\lambda^2) \quad (\text{mJy}) \quad (2)$$

where r_λ is the radius (in pixels) of the circular aperture inside which the galaxy counts were determined⁸.

For point-like, faint sources near the detection limit the random error due to photon noise from the dominant foreground zodiacal light, $err(p)_\lambda$, can be dominant. Random uncertainties can be estimated using the relation:

$$err(p)_\lambda = \sigma(p)_\lambda \sqrt{(\pi r_\lambda^2)} \quad (\text{mJy}) \quad (3)$$

where $\sigma(p)_\lambda$ (from Cols. 8 and 13 in Table 2) is the pixel per pixel rms. The total uncertainty in the flux determination (given in Table 2) is thus:

$$err_\lambda = \sqrt{err(s)_\lambda^2 + err(p)_\lambda^2} \quad (\text{mJy}). \quad (4)$$

Since we did not included the uncertainties induced by transient remnants (see previous point 1), the total error given in Eq. (4) is underestimated.

Indeed, this relation generally leads to photometric errors smaller than those given by Roussel et al. (2001b) for the galaxies in common. The reason for that is that the errors quoted here do not include those due to incomplete short-term transient correction. These were estimated on a case by case basis by Roussel et al. (2001b) using a method that is impractical to implement on a larger sample such as this one. This comparison clearly shows the dominant impact of short-term transient on ISOCAM photometry.

⁸ As explained in the previous section, r_λ is on average $\sim 20\%$ larger than the mid-IR major axis radius of the galaxy.

We performed an internal check on the accuracy of the photometry by comparing total flux densities extracted from images independently reduced with different parameters. This test has been done on both LW2 and LW3 images of 20 galaxies. The consistency on the flux densities extracted on images reduced using different parameters for the long-term transient and flat-field corrections (see Miville-Deschênes et al. 2000 for details) is generally within $\sim 15\%$. Only a few objects where the gradient in the sky background has not been successfully removed by the task IMSURFIT (see previous section) have larger inconsistencies.

These tests, however, do not give an estimate of the systematic error since they are based on the analysis of non-independent data. The galaxy VCC 1686 has two independent datasets since it has been observed twice during the ISO Virgo observations: once with a dedicated raster, and once as a serendipitous observation in the raster field of VCC 1690. The results of the different observations are given in Table 3.

Even if the discrepancy between the two observations are high, the two sets of data are consistent within the errors. We do not know whether this case is representative of weak sources (we however detect sources ~ 10 times weaker than VCC 1686), or holds also for brighter sources, with higher signal to noise. For general purposes we can assume that the photometric error on the absolute flux densities of these ISOCAM images is $\sim 30\%$. We warn however of conceiving the ISOCAM errors as a constant fraction of the object's flux. This is generally wrong: for most objects observed with ISOCAM, the major source of noise is the zodiacal background, which is often much brighter than the object itself. Errors quite routinely reach a few % to less than 1% of the background level (as is clearly the case for the ISO-Virgo sample observations). Depending on the source brightness however, this can lead to much larger errors, when expressed as a function of the source flux.

4.2. Resolved galaxies

Thirty-four galaxies have been fully resolved by ISOCAM at $6.75 \mu\text{m}$. Their images (obtained after a rebinning to 1 arcsec/pixel using a linear interpolation) are shown in Fig. 1 as grey levels. All images of late-type galaxies are characterized by a strong nuclear emission, a diffuse and extended emission, and by the emission of the brightest spiral patterns (see for instance VCC 1555 or VCC 1727). Early-type galaxies such as VCC 1978 show only a nuclear and a diffuse emission.

Radial profiles and colours of the near-IR images (Fig. 1) have been obtained using the same procedure adopted in Gavazzi et al. (2000). For each rebinned frame the sky background was determined in regions of “empty” sky, and it was subtracted from the frame. Sky-subtracted frames were inspected individually and the light of unwanted superposed or nearby stars and galaxies was masked.

The 2-dimensional light distribution of each galaxy was fitted with elliptical isophotes, using a modified version of the STSDAS ISOPHOTE package. Starting from a set of initial parameters given manually, the fit maintains as free parameters the ellipse center, ellipticity and position angle. The ellipse

semi-major axis is incremented by a fixed fraction of its value at each step of the fitting procedure. The routine halts when the surface brightness found in a given corona equals the sky rms. The fit fails to converge for some galaxies with very irregular light distributions. In these cases we keep fixed one or more of the initial parameters. The resulting radial light profiles are fitted with models of the galaxy light distribution: a de Vaucouleurs $r^{1/4}$ law (de Vaucouleurs 1948) or an exponential disc law, or a combination of the two. Total flux densities are then obtained by adding to the flux density measured within the outermost significant isophote the value extrapolated to infinity along either the $r^{1/4}$ (dV galaxies), or the exponential law that fitted the outer parts of the galaxy (pure discs and B+D galaxies)⁹. This routine gives also the concentration index (C_{31}), defined in de Vaucouleurs (1977) as the model-independent ratio between the radii that enclose 75% and 25% of the total flux. Values of $C_{31} \leq 3$ are for pure exponential discs, >3 for galaxies with prominent bulges and/or nuclei.

Results of the fitting procedures are given in Table 4, arranged as follows:

- Column 1: VCC galaxy name.
- Column 2: $C_{31}(6.75)$ concentration index at $6.75 \mu\text{m}$.
- Column 3: $6.75 \mu\text{m}$ isophotal major axis radius $r_5(6.75)$ at $5 \mu\text{Jy arcsec}^{-2}$, in arcsec.
- Column 4: $6.75 \mu\text{m}$ effective radius $R_e(6.75)$, the radius containing half of the total light, in arcsec.
- Column 5: $6.75 \mu\text{m}$ effective surface brightness, the mean surface brightness within $R_e(6.75)$, in $\mu\text{Jy arcsec}^{-2}$.
- Columns 6, 7, 8 and 9: $15 \mu\text{m}$ $C_{31}(15)$ concentration index, isophotal major axis radius $r_5(15)$, effective radius $R_e(15)$ and surface brightness $\mu_e(15)$.

Light profiles are reliable only outside the diffraction limit of each filter, the colour profile outside 8 arcseconds, which represents the diffraction limit at $15 \mu\text{m}$, as indicated by the vertical dashed line in the $F(6.75)/F(15)$ colour profile given in Fig. 1. The error in the light profile is dominated by the presence of large scale gradients in the sky background, left over by the flat-fielding procedure. These errors affects mostly the large scale, low surface brightness extended regions.

Late-type galaxies have a variety of mid-IR light profiles, from pure exponential discs such as VCC 66 to bulge plus disc profile (VCC 1110), or irregular profiles such as VCC 92.

Mid-IR and optical isophotal radii are strongly related one another (see Fig. 3).

The best fit gives the following relationships:

$$r_5(6.75) = 0.375 \times (a/2) + 8.321 \quad R^2 = 0.52 \quad (5)$$

and

$$r_5(15) = 0.408 \times (a/2) + 2.428 \quad R^2 = 0.46. \quad (6)$$

These relationships are used to estimate the mid-IR extension of undetected sources (see Sect. 4).

⁹ For homogeneity, the flux densities of the 34 fully resolved galaxies given in Table 2 are not the extrapolated values obtained by this fitting procedure but are those obtained with the QPHOT task described in Sect. 4.

Table 3. Flux density estimates for the two independent observations of VCC 1686.

Frame	$F(6.75)$ mJy	$\sigma(s)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	$Bg(6.75)$ $\mu\text{Jy arcsec}^{-2}$	$F(15)$ mJy	$\sigma(s)_{15}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{15}$ $\mu\text{Jy arcsec}^{-2}$	$Bg(15)$ $\mu\text{Jy arcsec}^{-2}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1686	20.39 ± 1.73	0.2	0.5	144.0	10.63 ± 3.93	0.6	1.0	1085.0
1690	27.60 ± 4.29	0.5	0.7	143.9	20.94 ± 10.7	1.3	1.8	872.0

Fig. 3. The relationship between mid-IR and optical isophotal radii. The dashed line is the best fit given in Eqs. (5) and (6).

5. Comparison with the literature

The mid-IR data of the ISO Virgo sample and of the A1367 and Coma clusters sample were previously processed by Boselli et al. (1997a, 1998) and Contursi et al. (2001) using CIA v1.0 and v2.0. Compared to these versions, the current processing incorporates, in increasing order of impact of the quality and accuracy of the photometry: (1) a slight variation of the calibration factors (~ 1 – 2%) (2) an accurate modeling of the time dependency of the dark current, (3) time variable flat-fielding, (4) removal of the long-term transient, and (5) a better modeling of the short-term transients that in particular takes into account the fact that downward transients are different from upward ones.

Roussel et al. (2001b) published 6.75 and 15 μm flux densities for 23 of the brightest Virgo galaxies, obtained reducing the data using CIA v3.0, i.e. with time-dependent dark correction, physical modeling of the short-term transient, but with a rather simplistic implementation of Miville-Deschênes et al. (2000) methods. Comparison between the mid-IR flux densities obtained in this work with those available in the literature is shown in Figs. 4a,b.

The different reduction processes produce consistent sets of data. The new data reduction process used in this work significantly reduces the noise in the ISOCAM images with respect to the early pipeline, allowing a higher detection rate at low luminosity and low surface brightness Virgo cluster galaxies. In the present work we have 13 and 11 more detections than in Boselli et al. (1998) at 6.75 μm and 15 μm respectively.

The ratio of the mid-IR flux densities obtained in this work to those given in the literature is however constant only for the brightest two thirds of the sample ($F(6.75\mu\text{m}) \geq 6$ mJy, $F(15\mu\text{m}) \geq 10$ mJy). For the weaker sources Boselli et al. (1998) and Contursi et al. (2001) overestimated their fluxes.

The impact of the new photometry on the scientific results presented in Boselli et al. (1997a, 1998) are presented in Boselli et al. (2003) and will be further discussed in future communications.

6. Analysis

The ratio of the observed flux densities at 6.75 and 15 μm can be used to study the origin of the emission at these wavelengths. Figure 5 shows the relationships between the 6.75 to 15 μm flux density ratio and various structural parameters of the sample galaxies, i.e. the H band luminosity (Fig. 5a), which is a direct tracer of the total dynamical mass (Gavazzi et al. 1996), the morphological type (Fig. 5b), the K concentration index (Fig. 5c), which is indicative of the spatial distribution of the old stellar population within galaxies, and the $C_{31}(6.75)$ index (Fig. 5d), available only for the resolved galaxies.

Figure 5a shows that the observed mid-IR colour index shows a weak trend with the total mass: massive galaxies have $F(6.75\mu\text{m})/F(15\mu\text{m})$ higher than low mass objects. All early-type galaxies have $F(6.75\mu\text{m})/F(15\mu\text{m}) > 1$, while in late-types the $F(6.75\mu\text{m})/F(15\mu\text{m})$ ratio ranges between ~ 0.3 and 5. No relation is observed between the mid-IR colour index and the underlying stellar distribution. Five out of six galaxies with a mid-IR colour $F(6.75\mu\text{m})/F(15\mu\text{m}) > 3$ have a peaked emission at 6.75 μm ($C_{31}(6.75) > 5$), while $\sim 95\%$ of the objects with an exponential light profile at 6.75 μm have $F(6.75\mu\text{m})/F(15\mu\text{m}) \leq 2$.

Fig. 4. The ratio of the flux densities obtained in this work with those available in the literature versus our flux densities at **a)** $6.75 \mu\text{m}$ and **b)** $15 \mu\text{m}$. The dashed line indicates a linear relation between the two sets of data. Crosses are for Roussel et al. (2001b), filled dots for Contursi et al. (2001), while open dots and open triangles are for detected and undetected (upper limits) galaxies in Boselli et al. (1998), respectively.

Fig. 5. The relationship between the mid-IR colour index $F(6.75 \mu\text{m})/F(15 \mu\text{m})$ and **a)** the total mass (as traced by the H band luminosity), **b)** the morphological type, **c)** the K band $C_{31}(K)$ concentration index and **d)** the mid-IR $C_{31}(6.75 \mu\text{m})$ concentration index. Filled dots are for galaxies detected at 6.75 and $15 \mu\text{m}$, open triangles for galaxies undetected at $15 \mu\text{m}$.

Fig. 6. The relationship between the mid-IR and the near-IR and visible concentration indices.

The relationships between the mid-IR and the near-IR and visible concentration indices (this last being weak), shown in Fig. 6, indicate that bulge dominated galaxies ($C_{31}(K) \geq 3$) have peaked mid-IR distributions.

High values of $F(6.75\mu\text{m})/F(15\mu\text{m})$ are expected when the contribution of the black-body tail of the cold stellar population to the total mid-IR emission becomes important: our observational evidences indicate that the contribution of the old stellar population to the mid-IR emission is important in early-type and/or massive galaxies, with prominent bulges, with a centrally peaked mid-IR light distribution. Dust emission is dominant in low-mass objects characterized by an exponential distribution of the visible, near- and mid-IR light. This picture is coherent with our previous results given in Boselli et al. (1998), and confirmed by our recent analysis of the spectral energy distribution (SED) presented in Boselli et al. (2003).

No strong relationships are observed between the ratio of the mid-IR effective radii and surface brightnesses and other structural parameters, such as the H band luminosity, the morphological type and the $C_{31}(K)$ concentration index. A weak trend is however observed between the ratio of the mid-IR $6.75\mu\text{m}$ to visible isophotal radii and the morphological type (if limited to spirals) and $C_{31}(K)$ concentration index (Fig. 7), indicating that the mid-IR disc is more extended in Sc galaxies characterized by exponentially declining light distributions (both near- and mid-IR) than in bulge-dominated Sa.

Colour profiles are generally flat, with an average value of $F(6.75\mu\text{m})/F(15\mu\text{m})$ flux density ratio of ~ 1 . Only a few objects present peculiar colour profiles: some galaxies have 6.75 to $15\mu\text{m}$ flux densities ratios lower than one in the central region (VCC 836, and to a lower extent VCC 460, VCC 1003, VCC 1690, VCC 1727 and VCC 1813). All but one (VCC 1813) are active galaxies (Syfert, LINER). Laurent et al. (2000) have shown that in active galaxies such as AGN the $F(6.75\mu\text{m})/F(15\mu\text{m})$ ratio is expected to be lower than one. On the contrary, the Sa VCC 1158 and VCC 2070 have 6.75 to $15\mu\text{m}$ flux densities ratios increasing towards the centre probably due to an higher contribution at $6.75\mu\text{m}$ than at $15\mu\text{m}$ of the old stellar component. The two resolved S0a galaxies VCC 1253 and VCC 1978 have flat colours, with a 6.75 to $15\mu\text{m}$ flux density ratio ≥ 2 . The emission is diffuse without any evident morphological structure. 6.75 to $15\mu\text{m}$ flux density ratio ≥ 2 in early-type galaxies are easily obtained if their mid-IR emission is dominated by the cold stellar population. Morphological considerations are thus in total agreement with those obtained by the analysis of the SED (Boselli et al. 2003).

7. Conclusion

We present new ISOCAM imaging data taken at 6.75 and $15\mu\text{m}$ for a complete, optically-selected, volume-limited sample of 99 late-type ($\geq \text{S0a}$) galaxies in the Virgo cluster. This sample is composed of 71 objects in the cluster periphery, with

Fig. 7. The relationship between the mid-IR 6.75 μm to visible isophotal radii and **a)** the total mass (as traced by the H band luminosity), **b)** the morphological type, **c)** the K band $C_{31}(K)$ concentration index and **d)** the mid-IR $C_{31}(6.75)$ concentration index.

a projected angular distance $\theta \geq 4^\circ$ from M 87, and 28 in the cluster core ($\theta \leq 2^\circ$). ISOCAM data for another 24 galaxies in the Virgo cluster serendipitously observed in the same frame of other objects (18 galaxies), or found in the ISOCAM data archive (6 galaxies), are also presented. To these we add 22 galaxies in the Coma/A1367 supercluster, out of which 13 are Coma members and 6 are in A1367.

All the data here presented are reduced and analysed in a homogeneous way. Out of the 145 observed galaxies, 34 objects, all in the Virgo cluster, were fully resolved by ISOCAM: for these objects we present images, light profiles and colour profiles, as well as effective and isophotal radii, surface brightnesses and light concentration indices.

Our analysis shows that the mid-IR colours of the target galaxies are weakly correlated with the total mass of galaxies, as traced by the H band luminosity, with high values of $F(6.75 \mu\text{m})/F(15 \mu\text{m})$ (≥ 1) found generally in massive objects ($L_H \geq 10^{10} L_{H\odot}$), and $F(6.75 \mu\text{m})/F(15 \mu\text{m}) \leq 1$ in low-mass ($L_H \leq 10^{10} L_{H\odot}$) dwarf galaxies. All early-type galaxies (type $\leq \text{S0a}$) have $F(6.75 \mu\text{m})/F(15 \mu\text{m}) \geq 1$, as expected if the mid-IR emission is dominated by the photosphere of the cold stellar population.

The mid-IR, near-IR and visible light concentration indices are tightly correlated in bright, resolved galaxies, indicating that the spatial distribution of the mid-IR emitting sources is, to the first order, similar to that of the stars.

The analysis on the origin of the mid-IR emission of late-type galaxies is postponed to a forthcoming communication.

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Online Material

Table 1. The target galaxies.

The ISO Virgo sample			RA(2000)	dec	Type	m_{pg}	a	b	Dist	Memb.	θ	$C_{31}(K)$	$C_{31}(B)$	notes
VCC	UGC	NGC/IC	h m s	° ' "			'	'	Mpc		deg			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	-	-	120820.02	134100.2	BCD?	14.78	0.80	0.18	32	M	5.63	3.36	2.68	
4	-	-	120830.75	150548.2	Im	17.50	0.50	0.43	32	M	6.06	-	-	
17	7150	3023	121001.86	142142.4	Im	15.20	0.91	0.45	32	M	5.43	2.85	2.37	
24	-	-	121035.65	114538.5	BCD	14.95	1.00	0.37	32	M	4.99	6.23	2.78	
26	-	-	121040.20	143848.5	Im	17.50	0.43	0.27	32	M	5.39	2.35	-	
66	7215	4178	121246.27	105156.0	SBC(s)	11.89	5.35	1.87	17	N	4.68	3.24	1.62	*
81	7223	4186	121326.18	144620.1	d:Sc	15.60	0.95	0.81	17	N	4.85	3.22	2.64	
87	-	-	121340.91	152713.2	Sm	15.00	1.45	0.72	17	N	5.17	3.18	-	
92	7231	4192	121348.24	145401.2	Sb:	10.92	9.78	2.60	17	N	4.84	5.04	2.84	*
130	-	-	121504.22	94513.5	BCD	16.50	0.63	0.25	17	N	4.68	2.71	-	
152	7268	4207	121530.31	93508.6	Scd(on edge)	13.48	1.96	0.89	17	N	4.69	3.54	2.21	
159	-	-	121541.50	81707.7	Im	15.08	1.04	0.52	32	W	5.54	2.73	-	
169	-	-	121556.39	93855.7	Im	16.50	0.85	0.43	17	N	4.57	-	-	
171	-	-	121558.88	82225.8	Im	17.40	0.57	0.36	32	W	5.43	-	-	
207	-	-	121648.07	80302.0	BCD	17.20	0.36	0.13	32	W	5.55	2.63	-	
318	7352	776	121903.40	85122.7	SBCd	14.01	1.71	1.00	32	W	4.57	2.93	-	
425	-	-	122035.90	81209.3	Im:	17.30	0.43	0.38	23	B	4.89	-	-	
459	-	-	122111.46	173818.5	BCD	14.95	0.84	0.36	17	A	5.74	3.09	-	
460	7405	4293	122112.68	182256.5	Sa pec	11.20	5.10	2.92	17	A	6.42	3.52	2.83	*
655	7468	4344	122337.45	173228.5	S pec,N/BCD	13.21	1.55	1.55	17	A	5.44	2.50	-	
664	7470	3258	122344.36	122842.5	Sc	13.50	2.60	1.87	17	A	1.73	2.55	-	
666	-	-	122346.13	164728.5	Im:	16.80	1.00	0.57	17	A	4.72	2.80	-	
692	7476	4351	122401.37	121216.6	Sc(s)	12.93	2.92	1.87	17	A	1.67	2.95	-	
809	7510	3311	122533.17	121536.3	Sc (on edge)	14.55	1.45	0.36	17	A	1.30	3.24	-	
836	7520	4388	122546.60	123940.4	Sab	11.83	5.10	1.24	17	A	1.26	4.69	13.70	*
848	-	-	122552.78	54829.5	Im pec/BCD	14.72	1.16	0.98	23	B	6.70	2.86	-	
857	7523	4394	122555.64	181249.5	SBB(sr)	11.76	3.60	3.60	17	A	5.94	5.64	4.11	*
873	7528	4402	122607.32	130643.6	Sc (on edge)	12.56	3.95	1.16	17	A	1.36	2.95	2.40	
890	-	-	122620.85	64005.7	BCD	16.00	0.21	0.21	23	B	5.83	2.64	-	
912	7538	4413	122632.16	123639.8	SBB(rs)	12.97	2.92	1.75	17	A	1.07	3.14	-	
971	7556	4423	122708.93	55248.1	Sd (on edge)	14.28	3.06	0.43	23	B	6.57	3.44	-	
984	7562	4425	122713.30	124405.1	SBA	12.82	2.99	1.00	17	A	0.94	4.68	4.36	
995	7565	3371	122721.55	105155.2	Sc (on edge)	15.32	1.53	0.11	17	A	1.75	3.43	2.69	
1002	7566	4430	122726.37	61544.2	SBC(r)	12.48	3.02	2.69	23	B	6.19	2.73	2.38	
1003	7568	4429	122726.31	110629.2	S0/Sa pec	11.15	8.12	3.52	17	A	1.53	5.48	4.65	*
1043	7574	4438	122745.52	130031.4	Sb (tides)	10.91	8.12	3.68	17	A	0.97	10.21	8.30	*
1047	7581	4440	122753.52	121735.5	SBA(sr)	12.48	2.01	1.71	17	A	0.72	7.42	-	
1110	7594	4450	122829.27	170506.8	Sab pec	10.93	6.15	4.04	17	A	4.73	4.33	3.65	*
1158	7613	4461	122903.01	131101.1	Sa	12.09	3.52	1.29	17	A	0.90	7.45	6.69	
1189	7621	3414	122928.83	64612.3	Sc(s)	13.70	1.84	1.07	17	S	5.63	2.42	-	
1196	7628	4468	122931.25	140258.3	S0/Sa	13.80	1.76	1.06	17	A	1.69	4.31	-	
1217	7630	3418	122942.54	112404.4	SBM	14.59	1.87	1.29	17	A	1.03	2.80	-	
1253	7638	4477	123002.37	133810.6	SBO/SBa	11.31	3.60	3.60	17	A	1.26	8.73	5.86	*
1257	-	-	123004.68	172401.6	Im pec	16.50	1.36	0.32	17	A	5.01	2.55	-	
1326	7657	4491	123057.15	112859.1	SBA(s)	13.41	1.89	0.94	17	A	0.91	2.87	-	
1368	7665	4497	123132.79	113736.4	SBO/SBa	13.12	2.01	0.85	17	A	0.78	2.81	-	
1379	7669	4498	123139.62	165107.5	SBC(s)	12.62	2.85	1.53	17	A	4.46	2.27	2.11	
1410	7677	4502	123203.22	164114.7	Sm	14.57	1.48	0.78	17	A	4.31	2.8	2.91	
1412	7680	4503	123206.13	111034.8	Sa	12.12	4.33	1.71	17	A	1.25	5.95	5.45	
1419	7682	4506	123210.46	132509.8	Spec(dust)	13.64	2.16	1.29	17	A	1.08	3.44	-	
1450	7695	3476	123241.91	140256.1	Sc(s)	13.29	2.60	2.01	17	A	1.72	2.93	-	
1552	7729	4531	123415.77	130429.1	Sa pec	12.58	4.24	2.42	17	A	1.08	3	3.00	
1554	7726	4532	123419.31	62807.1	Sm	12.30	2.60	1.00	17	S	5.99	2.92	2.38	
1569	-	3520	123431.68	133013.2	Scd:	15.00	1.07	0.71	17	A	1.43	3.16	-	
1575	7736	3521	123439.28	70938.3	SBM pec	13.98	2.00	1.41	17	S	5.32	2.44	1.99	
1581	7739	-	123444.93	61807.4	Sm	14.55	1.46	1.16	17	S	6.17	2.77	-	
1596	-	-	123500.91	91116.5	Im:	17.24	0.35	0.16	17	S	3.36	-	-	
1673	7777	4567	123632.66	111528.6	Sc(s)	12.08	2.92	1.87	17	A	1.80	2.73	2.80	*
1675	-	-	123634.65	80317.6	Pec	14.47	1.26	0.74	17	S	4.56	2.87	-	
1676	7776	4568	123634.16	111419.6	Sc(s)	11.70	5.10	1.75	17	A	1.82	4.27	2.87	*
1678	7781	3576	123637.61	63716.6	SBD	13.70	2.16	1.87	17	S	5.94	2.91	-	*
1686	7784	3583	123643.57	131531.7	Sm	13.95	2.79	1.71	17	A	1.68	2.98	2.41	
1690	7786	4569	123649.78	130945.7	Sab(s)	10.25	10.73	5.35	17	A	1.65	4.37	3.11	*
1699	7790	3589	123702.24	65530.9	SBM	14.11	1.55	0.83	17	S	5.68	2.64	-	
1725	-	-	123741.51	83331.3	Sm/BCD	14.51	1.55	0.97	17	S	4.19	2.92	-	
1726	7795	-	123745.08	70622.4	Sdm	14.54	1.29	1.00	17	S	5.55	2.73	-	
1727	7796	4579	123743.48	114904.4	Sab(s)	10.56	6.29	4.87	17	A	1.78	4.51	3.30	*
1730	7794	4580	123748.60	52206.4	Sc/Sa	12.61	2.16	1.60	17	S	7.23	2.68	-	
1750	-	-	123815.48	65938.7	BCD?	16.50	0.31	0.16	17	S	5.70	2.54	-	
1757	7803	4584	123817.79	130635.8	Sa(s)pec	13.60	1.87	1.00	17	A	1.96	3.53	-	
1758	7802	-	123820.81	75328.8	Sc (on edge)	14.99	1.71	0.27	17	S	4.87	3.47	-	
1784	-	-	123913.81	153749.4	Im	15.84	0.79	0.63	17	E	3.83	2.80	-	
1789	-	-	123921.34	45619.5	Im	15.07	1.10	0.62	17	S	7.74	2.46	-	
1791	7822	3617	123924.55	75752.5	SBM/BCD	14.67	1.29	0.64	17	S	4.90	2.86	-	
1804	-	-	123940.25	92355.7	Im/BCD	15.63	0.75	0.30	17	E	3.70	4.33	3.75	
1811	7826	4595	123951.63	151753.9	Sc(s)	12.92	2.16	1.42	17	E	3.64	2.71	-	
1813	7828	4596	123955.88	101034.9	SBA	11.51	4.76	4.04	17	E	3.14	5.44	4.46	
1822	-	-	124010.14	65050.1	Im	15.60	0.63	0.25	17	S	6.00	2.79	2.83	

Table 1. continued.

VCC	UGC	NGC/IC	RA(2000) h m s	dec ° ' "	Type	m_{pg}	a '	b '	Dist Mpc	Memb.	θ deg	$C_{31}(K)$	$C_{31}(B)$	notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1885	-	-	124137.57	154933.2	Im	16.41	1.16	0.57	17	E	4.32	2.80	-	
1918	-	-	124218.10	54421.7	Im	15.80	1.03	0.36	17	S	7.23	2.81	-	
1929	7874	4633	124237.12	142122.0	Scd(s)	13.77	2.48	1.07	17	E	3.48	3.14	2.82	
1932	7875	4634	124240.83	141746.0	Sc (on edge)	13.19	2.92	0.87	17	E	3.45	3.08	2.19	
1952	-	-	124306.86	73858.4	Im	16.00	0.71	0.35	17	E	5.62	2.93	-	
1970	-	-	124329.11	100534.7	Im,N?	15.80	0.71	0.50	17	E	3.86	2.94	-	
1972	7896	4647	124332.28	113454.7	Sc(rs)	12.03	2.60	2.16	17	E	3.21	3.06	-	*
1987	7902	4654	124356.71	130734.0	SBc(rs)	11.14	4.99	2.60	17	E	3.28	2.93	2.17	
1992	7906	-	124410.02	120659.2	Im	15.50	0.81	0.51	17	E	3.27	2.80	3.16	
1999	7915	4659	124429.38	132953.5	Sa	13.08	1.99	1.25	17	E	3.51	6.03	-	
2006	7920	3718	124445.93	122111.7	Amorphous	13.68	2.60	0.71	17	E	3.40	3.19	-	
2007	-	3716	124447.50	80629.7	Im/BCD:	15.20	0.78	0.41	17	E	5.49	2.70	-	
2023	7932	3742	124531.55	131951.3	SBc(s)	13.86	2.01	1.00	17	E	3.70	3.09	-	
2033	-	-	124604.76	82830.8	BCD	14.65	0.73	0.73	17	E	5.42	3.70	-	
2034	-	-	124607.96	100948.8	Im	15.82	0.78	0.52	17	E	4.36	2.46	9.72	
2037	-	-	124615.15	101224.9	Im/BCD	15.92	0.88	0.38	17	E	4.37	2.92	3.60	
2058	7965	4689	124745.39	134548.3	Sc(s)	11.55	5.86	4.44	17	E	4.34	2.80	2.78	
2066	7969	4694	124815.05	105906.7	Amorphous	12.19	3.20	1.16	17	E	4.49	4.21	6.88	*
2070	7970	4698	124822.96	82913.8	Sa	11.53	5.67	2.84	17	E	5.82	5.78	5.90	*
2087	7997	4733	125106.81	105444.3	SB0/a	12.63	1.96	1.96	17	E	5.18	2.73	-	
2094	-	-	125235.75	102648.7	Im:	17.80	0.37	0.37	17	E	5.68	-	-	

The Virgo serendipitous sample

VCC	UGC	NGC/IC	RA(2000) h m s	dec ° ' "	Type	m_{pg}	a '	b '	Dist Mpc	Memb.	θ deg	$C_{31}(K)$	$C_{31}(B)$	notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
5	-	-	120833.15	150718.2	dE	18.90	0.39	0.25	32	M	6.06	-	-	
79	-	-	121320.19	144819.1	Im?	17.20	0.57	0.28	17	N	4.89	-	1.75	
90	-	-	121347.15	145013.2	dE	18.50	0.33	0.33	17	N	4.81	-	-	
147	-	-	121526.42	93543.6	dE,N	19.00	0.25	0.25	17	N	4.70	-	-	
644	-	-	122329.26	173228.4	dE	20.00	0.28	0.28	17	A	5.45	-	-	
823	-	-	122539.36	121853.4	dE,N	16.06	0.84	0.84	17	A	1.27	-	-	
832	-	-	122544.10	124029.4	dE?	19.00	0.28	0.28	17	A	1.28	-	2.75	
884	-	-	122615.21	130829.6	dE:	18.50	0.43	0.43	17	A	1.34	-	-	
899	-	-	122626.24	64229.7	Sm:	16.60	0.57	0.28	56	Bckg	5.79	-	-	
1018	7570	4432	122732.87	61354.3	Sc(s)	14.81	1.10	1.10	86.2	Bckg	6.21	-	2.87	
1030	7575	4435	122740.42	130444.3	SB0	11.84	2.92	2.48	17	A	1.03	10.06	7.07	*
1146	7610	4458	122857.51	131431.0	E	12.93	1.80	1.52	17	A	0.96	7.99	7.65	
1366	-	-	123131.30	113544.4	dE,N	17.60	0.35	0.35	17	A	0.81	-	-	
1385	-	-	123147.21	165014.6	dE?,N	19.00	0.20	0.20	17	A	4.45	-	-	
1821	-	-	124008.93	65302.1	?	17.20	0.41	0.20	17	S	5.97	-	1.90	
1944	-	-	124251.62	141722.2	BCD?	18.00	0.46	0.22	17	E	3.49	-	-	
1978	7898	4649	124339.58	113309.8	S0	9.81	5.10	5.10	17	E	3.25	4.96	-	*
2028	-	-	124537.25	131942.4	dE:	16.60	0.85	0.27	17	E	3.72	-	-	

Other galaxies in the Virgo cluster

VCC	UGC	NGC/IC	RA(2000) h m s	dec ° ' "	Type	m_{pg}	a '	b '	Dist Mpc	Memb.	θ deg	$C_{31}(K)$	$C_{31}(B)$	notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1226	7629	4472	122946.74	80001.4	E/S0	9.31	10.25	8.11	17	S	4.40	7.34	6.56	*
1508	7709	4519	123330.18	83916.6	SBc(rs)	12.34	3.60	2.60	17	S	3.79	3.17	-	
1555	7727	4535	123420.32	81154.1	SBc(s)	10.51	8.33	7.43	17	S	4.28	2.18	2.60	
1632	7760	4552	123539.87	123325.0	S0	10.78	7.23	7.23	17	A	1.19	7.92	-	*
1939	7878	4636	124249.63	24118.1	E/S0	10.48	9.63	8.79	17	S	10.15	10.44	5.77	*
CGCG43041	7985	4713	124957.78	51839.2	Sc	12.3	3.20	2.16	17	S	8.51	2.93	-	*

Galaxies in the clusters A1367 and Coma

CGCG	UGC	NGC/IC	RA(2000) h m s	dec ° ' "	Type	m_{pg}	a '	b '	Dist Mpc	Memb.	θ deg	$C_{31}(K)$	$C_{31}(B)$	notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
97062	-	-	114214.64	195832.5	Pec	15.5	1.01	0.40	91.3	A1367	0.53	3.16	2.93	
97073	-	-	114256.43	195759.0	Pec	15.6	0.76	0.74	91.3	A1367	0.37	2.74	2.13	
97079	-	-	114313.35	200016.4	Pec	15.7	0.75	0.45	91.3	A1367	0.33	2.88	2.11	
97087	6697	-	114348.78	195809.7	Pec	14.3	2.00	0.50	91.3	A1367	0.20	3.45	1.82	*
97087N	-	-	114349.80	195834.0	Pec	17.2	0.20	0.15	91.3	A1367	0.20	-	-	
97138	-	-	114544.77	200151.1	Pec	15.5	0.75	0.64	91.3	A1367	0.38	2.93	-	
160020	-	-	125606.05	274039.9	Pec	15.5	0.45	0.22	96	Coma	0.90	2.13	2.97	*
160026	-	3913	125628.56	271729.2	Sc	15.5	0.85	0.55	96	Coma	1.03	3.95	2.9	
160055	8082	4848	125805.55	281432.8	Sab	14.2	1.51	0.58	96	Coma	0.48	4.12	2.96	
160067	-	-	125837.17	271036.0	Pec	15.4	0.56	0.52	96	Coma	0.85	2.40	-	
160076	-	-	125940.23	283751.2	Sc	15.6	0.64	0.60	96	Coma	0.65	3.25	-	
160086	-	-	130033.58	273814.2	Pec	15.4	0.75	0.54	96	Coma	0.37	3.34	-	*
160088	8118	842	130039.63	290111.1	Sb	14.6	1.12	0.64	96	Coma	1.05	3.15	2.25	
160095	8134	4921	130126.09	275308.1	Sb	13.7	2.28	2.23	96	Coma	0.35	3.46	2.83	
160127	-	-	130426.46	271816.7	Sc	15.5	0.95	0.64	96	Coma	1.21	3.40	-	
160128	-	-	130422.57	284838.5	Pec	15.3	0.63	0.62	96	Coma	1.29	3.00	2.38	*
160139	-	-	130637.92	285059.1	Pec	15.0	1.22	0.64	96	Coma	1.71	2.73	-	
160252	-	4040	130037.74	280328.2	Pec	15.1	0.85	0.36	96	Coma	0.18	3.26	2.22	
160260	8128	4911	130056.10	274727.5	Sa	13.7	1.89	1.50	96	Coma	0.30	2.47	2.28	

Table 1. continued.

Other galaxies in the Coma/A1367 supercluster														
CGCG	UGC	NGC/IC	RA(2000) h m s	dec ° ' "	Type	m_{pg}	a "	b "	$Dist$ Mpc	Memb.	θ deg	$C_{31}(K)$	$C_{31}(B)$	notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
159072N	7938	4676	124610.19	304354.7	Pec(tides)	14.8	2.20	0.40	88.4	Pair	4.07	3.53	-	*
159072S	7939	-	124611.38	304325.0	Pec(tides)	14.8	1.70	0.70	87.9	Pair	4.06	3.62	-	*
130023	-	860	131504.07	243701.3	Sa	14.8	0.96	0.61	54.1	Group	4.78	-	2.78	*

Notes on morphological type:

VCC 66: HII; VCC 92: M 98: HII and Seyfert; VCC 460: LINER; VCC 836: Seyfert2; VCC 857: LINER; VCC 1003: HII LINER; VCC 1030: LINER, tidally interacting with VCC 1043 (Arp 120); VCC 1043: LINER, tidally interacting with VCC 1030 (Arp 120); VCC 1110: LINER; VCC 1226: Seyfert2, M 49, Arp 134; VCC 1253: Seyfert 2; VCC 1632: LINER HII, M 89; VCC 1673: interacting with VCC 1676?; VCC 1676: interacting with VCC 1673?; VCC 1678: HII; VCC 1690: M 90: LINER, Seyfert; VCC 1727: M 58; LINER, Seyfert 1.9; VCC 1939: LINER; VCC 1972: interacting with VCC 1978 (M 60; Arp 116)?; VCC 1978: interacting with VCC 1972 (Arp 116)?; VCC 2066: HII; VCC 2070: Seyfert 2; CGCG 43041: LINER; CGCG 97087: merging system (Gavazzi et al. 2001); CGCG 130023: HII; CGCG 159072N,S: Arp 242 CGCG 160020: HII; CGCG 160086: starburst; CGCG 160128: HII.

Table 2. The results of the observations.

The ISO Virgo sample														
VCC	Raster	FOV	tint	$F(6.75)$	$Bg(6.75)$	$\sigma(s)_{6.75}$	$\sigma(p)_{6.75}$	Q	$F(15)$	$Bg(15)$	$\sigma(s)_{15}$	$\sigma(p)_{15}$	Q	Notes
(1)	(2)	(3)	(4)	mJy (5)	$\mu\text{Jy arcsec}^{-2}$ (6)	$\mu\text{Jy arcsec}^{-2}$ (7)	$\mu\text{Jy arcsec}^{-2}$ (8)	(9)	mJy (10)	$\mu\text{Jy arcsec}^{-2}$ (11)	$\mu\text{Jy arcsec}^{-2}$ (12)	$\mu\text{Jy arcsec}^{-2}$ (13)	(14)	(15)
1	3×3	6.4	2.10	1.15 ± 0.34	174.6	0.2	0.5	1	2.86 ± 0.60	1007.9	0.4	0.7	2	
4	3×3	6.4	2.10	<0.45	204.6	0.2	0.5	-	<0.79	1074.5	0.4	0.7	-	
17	3×3	6.4	2.10	0.98 ± 0.39	204.6	0.2	0.5	2	1.76 ± 0.46	1093.7	0.3	0.6	1	
24	3×3	6.4	2.10	0.37 ± 0.23	210.4	0.1	0.4	2	0.82 ± 0.75	1139.5	0.4	0.6	2	
26	3×3	6.4	2.10	<0.41	204.7	0.2	0.5	-	<0.71	1063.5	0.4	0.7	-	
66	5×5	9.6	2.10	229.59 ± 13.39	175.6	0.2	0.7	1	192.69 ± 63.23	1052.2	1.1	1.6	2	
81	3×3	6.4	2.10	<0.49	194.8	0.1	0.6	-	<0.99	1063.2	0.3	0.7	-	
87	3×3	6.4	2.10	2.18 ± 0.67	194.6	0.2	0.5	1	0.74 ± 0.80	1034.7	0.3	0.6	2	
92	7×7	12.8	2.10	900.15 ± 22.78	95.9	0.4	0.7	1	692.42 ± 18.06	632.1	0.3	1.3	1	
130	3×3	6.4	2.10	<0.55	237.3	0.2	0.5	-	<0.41	1283.9	0.1	0.7	-	
152	3×3	6.4	2.10	173.99 ± 1.52	236.4	0.4	0.7	1	145.13 ± 1.79	1039.3	0.4	0.6	1	
159	3×3	6.4	2.10	<0.90	177.9	0.2	0.5	-	<2.09	1068.6	0.6	0.7	-	
169	3×3	6.4	2.10	<0.73	235.8	0.2	0.5	-	<1.27	1256.2	0.4	0.7	-	
171	3×3	6.4	2.10	<0.50	178.9	0.2	0.5	-	<0.62	1073.1	0.3	0.7	-	
207	3×3	6.4	2.10	<0.36	178.2	0.2	0.4	-	<0.82	1050.3	0.6	0.7	-	
318	3×3	6.4	2.10	3.08 ± 0.84	227.1	0.2	0.5	1	5.16 ± 1.47	1041.0	0.4	0.6	2	
425	3×3	6.4	2.10	<0.25	171.1	0.1	0.5	-	<0.31	1048.0	0.1	0.6	-	
459	3×3	6.4	2.10	2.87 ± 0.20	171.6	0.1	0.5	1	2.96 ± 0.62	897.5	0.4	0.6	2	
460	5×5	9.6	2.10	195.11 ± 9.18	168.3	0.4	0.8	1	186.36 ± 10.86	917.0	0.4	1.0	1	
655	3×3	6.4	2.10	42.05 ± 0.68	166.4	0.4	0.7	2	15.17 ± 0.81	894.3	0.4	1.0	2	
664	3×3	6.4	2.10	7.09 ± 2.31	159.5	0.4	0.5	1	15.17 ± 3.63	972.5	0.6	0.6	1	
666	3×3	6.4	2.10	<0.88	168.8	0.2	0.6	-	<1.53	896.0	0.4	0.9	-	
692	3×3	6.4	2.10	33.64 ± 0.76	162.2	0.2	0.6	1	25.22 ± 1.33	997.7	0.4	0.9	1	
809	3×3	6.4	2.10	5.97 ± 0.67	185.3	0.2	0.5	1	3.57 ± 2.34	1016.7	0.9	0.7	1	
836	5×5	9.6	2.10	528.11 ± 6.89	156.7	0.4	0.7	1	1064.56 ± 10.87	992.8	0.6	1.0	2	
848	3×3	6.4	2.10	1.20 ± 0.27	168.2	0.1	0.4	1	<2.37	1032.9	0.6	0.7	-	
857	4×4	8.0	2.10	114.95 ± 4.93	167.4	0.4	0.6	1	98.30 ± 7.78	908.4	0.6	0.9	1	
873	4×4	8.0	2.10	500.01 ± 6.31	157.8	0.2	0.8	1	525.45 ± 11.19	980.7	0.4	1.4	1	
890	4×4	8.0	2.10	<0.28	174.0	0.2	0.5	-	<0.61	1052.7	0.6	0.6	-	*
912	3×3	6.4	2.10	60.94 ± 1.28	158.2	0.2	0.6	1	54.72 ± 2.99	993.5	0.6	0.9	1	
971	3×3	6.4	2.10	8.21 ± 2.00	165.8	0.2	0.5	1	6.57 ± 2.36	1010.6	0.3	0.6	1	
984	4×4	8.0	2.10	19.56 ± 0.33	154.6	0.2	0.5	1	9.69 ± 0.40	984.7	0.3	0.7	2	
995	3×3	6.4	2.10	1.40 ± 0.72	206.4	0.2	0.4	2	3.02 ± 1.69	1124.6	0.6	0.7	1	
1002	3×3	6.4	2.10	119.35 ± 4.23	167.0	0.5	1.0	2	72.17 ± 14.91	985.0	1.7	1.3	1	
1003	6×6	11.2	2.10	267.86 ± 8.05	175.2	0.2	0.7	1	192.87 ± 33.23	1090.7	1.0	1.4	1	
1043	7×7	12.8	2.10	259.53 ± 4.76	176.8	0.4	0.7	1	247.26 ± 15.00	905.3	1.1	1.6	1	
1047	3×3	6.4	2.10	-	-	-	-	-	5.09 ± 1.86	920.6	0.4	0.7	1	
1110	5×5	9.6	2.10	236.00 ± 6.80	158.9	0.2	0.7	1	252.78 ± 28.05	879.1	1.0	1.4	1	
1158	4×4	8.0	2.10	44.15 ± 0.70	149.7	0.2	0.6	1	16.45 ± 2.42	906.6	0.9	0.9	1	
1189	3×3	6.4	2.10	12.89 ± 0.94	162.5	0.2	0.6	1	5.80 ± 1.64	1008.8	0.4	0.7	1	
1196	3×3	6.4	2.10	6.03 ± 0.87	149.1	0.2	0.4	1	1.82 ± 3.05	890.3	0.9	0.7	2	
1217	3×3	6.4	2.10	3.65 ± 0.95	162.5	0.2	0.5	2	<6.65	1029.5	0.9	0.7	-	
1253	4×4	8.0	2.10	96.85 ± 1.13	150.0	0.2	0.5	1	28.74 ± 4.61	878.3	1.0	0.9	1	
1257	3×3	6.4	2.10	<1.24	159.8	0.2	0.5	-	1.75 ± 1.09	850.8	0.4	0.6	2	
1326	3×3	6.4	2.10	27.00 ± 0.96	167.4	0.2	0.4	1	70.10 ± 2.81	1054.0	0.7	0.6	1	
1368	3×3	6.4	2.10	8.62 ± 1.05	161.5	0.2	0.5	1	3.59 ± 1.25	1043.5	0.3	0.6	2	
1379	4×4	8.0	2.10	95.88 ± 3.06	162.7	0.2	0.5	1	62.02 ± 3.63	874.9	0.3	0.7	1	
1410	3×3	6.4	2.10	9.68 ± 0.70	161.4	0.2	0.6	1	4.51 ± 27.98	859.4	9.9	0.7	2	
1412	3×3	6.4	2.10	47.83 ± 5.30	166.2	0.4	0.5	1	13.47 ± 10.45	1051.6	0.7	0.9	1	
1419	3×3	6.4	2.10	16.31 ± 0.63	149.5	0.1	0.6	1	12.50 ± 2.74	894.4	0.6	0.7	1	
1450	3×3	6.4	2.10	72.46 ± 2.31	151.8	0.4	0.6	1	59.61 ± 3.64	881.2	0.6	0.9	1	
1552	4×4	8.0	2.10	40.15 ± 1.11	145.5	0.4	0.5	1	27.73 ± 1.32	888.3	0.4	0.7	1	
1554	3×3	6.4	2.10	183.96 ± 2.32	156.5	0.4	0.7	1	213.47 ± 2.75	996.5	0.4	0.9	1	
1569	3×3	6.4	2.10	0.80 ± 0.46	139.0	0.2	0.4	2	<2.15	826.1	0.6	0.6	-	
1575	3×3	6.4	2.10	47.48 ± 1.05	157.4	0.2	0.5	1	46.02 ± 1.25	994.5	0.3	0.7	1	
1581	3×3	6.4	2.10	<1.36	158.9	0.2	0.5	-	<2.38	996.5	0.4	0.6	-	

Table 2. continued.

VCC	Raster	FOV	t_{int}	$F(6.75)$	$Bg(6.75)$	$\sigma(s)_{6.75}$	$\sigma(p)_{6.75}$	Q	$F(15)$	$Bg(15)$	$\sigma(s)_{15}$	$\sigma(p)_{15}$	Q	Notes
(1)	(2)	(3)	(4)	mJy (5)	$\mu\text{Jy arcsec}^{-2}$ (6)	$\mu\text{Jy arcsec}^{-2}$ (7)	$\mu\text{Jy arcsec}^{-2}$ (8)	(9)	mJy (10)	$\mu\text{Jy arcsec}^{-2}$ (11)	$\mu\text{Jy arcsec}^{-2}$ (12)	$\mu\text{Jy arcsec}^{-2}$ (13)	(14)	(15)
1596	3×3	6.4	2.10	<0.21	157.4	0.1	0.4	-	<0.62	945.4	0.4	0.7	-	
1673	5×5	9.6	2.10	324.33 ± 6.48	174.8	0.4	0.7	1	319.63 ± 22.95	973.2	1.3	1.8	1	*
1675	3×3	6.4	2.10	<1.66	156.3	0.4	0.4	-	<0.77	975.1	0.1	0.7	-	
1676	5×5	9.6	2.10	973.91 ± 7.04	174.8	0.4	0.7	1	1050.86 ± 24.95	973.2	1.3	1.8	1	*
1678	3×3	6.4	2.10	<3.48	154.8	0.4	0.4	-	<10.93	962.0	1.1	0.6	-	
1686	4×4	8.0	2.10	25.20 ± 2.59	143.9	0.4	0.7	2	19.42 ± 4.07	872.3	0.6	1.0	2	*
1690	8×8	14.4	2.10	830.16 ± 18.63	144.2	0.4	0.7	1	972.71 ± 36.73	872.0	0.7	1.0	1	
1699	3×3	6.4	2.10	4.15 ± 0.74	150.6	0.2	0.5	1	14.04 ± 0.46	991.1	0.1	0.6	1	
1725	3×3	6.4	2.10	2.32 ± 0.38	150.9	0.1	0.4	2	2.70 ± 0.46	956.9	0.1	0.6	2	
1726	3×3	6.4	2.10	<0.60	158.2	0.1	0.4	-	<2.03	967.4	0.4	0.6	-	
1727	6×6	11.2	2.10	658.15 ± 31.02	172.2	0.6	0.7	1	646.18 ± 7.59	974.2	0.1	1.4	1	
1730	3×3	6.4	2.10	99.75 ± 1.17	155.1	0.2	0.5	1	97.40 ± 1.41	1051.0	0.3	0.9	1	
1750	3×3	6.4	2.10	0.28 ± 0.10	156.5	0.1	0.5	3	<0.93	940.1	0.7	0.9	-	
1757	3×3	6.4	2.10	<0.99	142.2	0.1	0.4	-	<2.27	867.9	0.3	0.7	-	
1758	3×3	6.4	2.10	5.92 ± 0.83	152.9	0.2	0.4	1	0.98 ± 0.99	938.5	0.3	0.6	2	
1784	3×3	6.4	2.10	<0.68	152.8	0.2	0.5	-	<2.69	843.5	1.0	1.0	-	
1789	3×3	6.4	2.10	1.40 ± 0.26	210.2	0.1	0.5	2	<2.78	1192.2	0.7	0.9	-	
1791	3×3	6.4	2.10	1.88 ± 0.57	151.9	0.2	0.4	2	2.97 ± 0.37	958.6	0.1	0.6	1	
1804	3×3	6.4	2.10	0.41 ± 0.17	178.2	0.1	0.4	2	<3.62	1020.4	1.4	0.9	-	
1811	3×3	6.4	2.10	74.49 ± 2.83	158.6	0.5	0.7	1	52.59 ± 2.51	877.3	0.4	0.7	1	
1813	5×5	9.6	2.10	126.86 ± 4.76	188.3	0.4	0.7	1	40.01 ± 13.12	1063.2	1.0	1.3	1	
1822	3×3	6.4	2.10	0.72 ± 0.15	151.9	0.1	0.4	2	<0.94	960.3	0.4	0.6	-	
1885	3×3	6.4	2.10	<1.02	153.1	0.2	0.4	-	<1.23	836.6	0.3	0.7	-	
1918	3×3	6.4	2.10	0.87 ± 0.45	204.6	0.2	0.5	2	1.00 ± 0.78	1170.9	0.4	0.6	2	
1929	6×6	11.2	2.10	29.28 ± 0.88	140.4	0.2	0.6	1	35.14 ± 2.55	827.4	0.7	1.3	1	*
1932	6×6	11.2	2.10	290.08 ± 3.30	140.4	0.2	0.6	1	265.79 ± 9.74	827.4	0.7	1.3	1	*
1952	3×3	6.4	2.10	<0.61	206.7	0.2	0.5	-	<1.05	1010.8	0.4	0.6	-	
1970	3×3	6.4	2.10	<0.61	163.1	0.2	0.5	-	<2.74	940.2	1.1	0.7	-	
1972	6×6	11.2	2.10	501.09 ± 2.34	181.0	0.4	1.0	1	493.38 ± 7.28	846.4	1.1	1.6	1	
1987	5×5	9.6	2.10	1051.86 ± 27.70	173.0	0.5	1.0	1	1101.42 ± 32.80	820.0	0.6	1.3	1	
1992	3×3	6.4	2.10	0.58 ± 0.18	138.6	0.1	0.4	3	<1.21 0.61	829.1	0.4	0.7	-	
1999	3×3	6.4	2.10	10.06 ± 1.04	140.7	0.2	0.5	1	3.98 ± 4.30	811.4	1.0	2.0	2	
2006	3×3	6.4	2.10	2.93 ± 0.78	170.3	0.1	0.4	1	1.49 ± 1.83	803.9	0.3	0.6	2	
2007	3×3	6.4	2.10	1.80 ± 0.33	202.2	0.2	0.5	1	<2.28	983.7	0.9	0.9	-	
2023	3×3	6.4	2.10	5.46 ± 1.05	135.3	0.2	0.5	1	5.45 ± 1.85	786.1	0.4	0.6	1	
2033	3×3	6.4	2.10	0.59 ± 0.17	196.5	0.1	0.4	2	1.17 ± 0.88	1097.2	0.7	0.6	3	
2034	3×3	6.4	2.10	0.19 ± 0.33	164.4	0.2	0.4	3	<0.49	926.7	0.1	0.7	-	
2037	3×3	6.4	2.10	<0.75	160.4	0.2	0.4	-	<1.72	947.0	0.6	0.5	-	
2058	5×5	9.6	2.10	316.50 ± 9.16	131.6	0.4	0.6	1	352.68 ± 18.06	797.9	0.7	1.0	1	
2066	4×4	8.0	2.10	68.00 ± 0.64	182.2	0.2	0.5	1	68.13 ± 2.96	1009.8	1.1	0.7	1	
2070	4×4	8.0	2.10	88.49 ± 2.95	185.7	0.2	0.5	1	66.58 ± 8.69	1026.9	0.7	1.0	1	
2087	3×3	6.4	2.10	11.46 ± 1.51	183.3	0.4	0.5	1	7.06 ± 1.21	1011.2	0.3	0.7	1	
2094	3×3	6.4	2.10	0.44 ± 0.19	185.9	0.2	0.5	3	<0.46	1013.3	0.3	0.7	-	

Table 2. continued.

The Virgo serendipitous sample														
VCC	Raster	FOV "	<i>tint</i> s	<i>F</i> (6.75) mJy	<i>Bg</i> (6.75) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	<i>F</i> (15) mJy	<i>Bg</i> (15) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{15}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{15}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
5	3×3	6.4	2.10	<0.38	204.6	0.2	0.5	-	<0.66	1074.5	0.4	0.7	-	4
79	3×3	6.4	2.10	<0.33	194.8	0.1	0.6	-	<0.62	1063.2	0.3	0.7	-	81
90	7×7	12.8	2.10	<0.52	95.9	0.4	0.6	-	<0.51	632.1	0.3	1.1	-	92
147	3×3	6.4	2.10	<0.32	236.4	0.2	0.6	-	<0.55	1039.3	0.4	1.0	-	152
644	3×3	6.4	2.10	<0.48	166.4	0.2	0.7	-	<0.58	900.8	0.4	1.0	-	655
823	3×3	6.4	2.10	<0.73	185.3	0.2	0.5	-	<2.46	1016.7	0.9	0.9	-	809
832	5×5	9.6	2.10	<0.48	156.4	0.2	0.7	-	<0.73	993.2	0.6	1.0	-	836
884	4×4	8.0	2.10	<0.49	157.8	0.2	0.7	-	<0.74	981.0	0.4	1.0	-	873
899	4×4	8.0	2.10	<0.50	174.0	0.2	0.5	-	<1.13	1052.7	0.6	0.6	-	890
1018	3×3	6.4	2.10	7.68 ± 0.74	167.4	0.4	0.7	2	2.02 ± 3.31	986.1	1.4	1.0	1	1002
1030	7×7	12.8	2.10	119.98 ± 4.61	177.3	0.4	0.7	1	76.48 ± 8.73	904.9	0.6	1.1	1	1043
1146	4×4	8.0	2.10	9.67 ± 0.91	149.7	0.2	0.6	1	4.83 ± 3.16	906.6	0.9	0.9	1	1158
1366	3×3	6.4	2.10	<0.38	161.5	0.2	0.6	-	<0.44	1043.5	0.3	0.7	-	1368
1385	4×4	8.0	2.10	<0.27	162.7	0.2	0.5	-	<0.34	874.9	0.3	0.7	-	1379
1821	3×3	6.4	2.10	<0.22	151.9	0.1	0.4	-	<0.67	960.3	0.4	0.6	-	1822
1944	6×6	11.2	2.10	0.32 ± 0.22	140.4	0.2	0.6	3	<1.22	827.4	0.7	1.0	-	1932
1978	6×6	11.2	2.10	431.24 ± 7.06	181.0	0.4	1.0	1	171.69 ± 22.18	845.4	1.1	1.3	1	1972
2028	3×3	6.4	2.10	<0.74	135.3	0.2	0.5	-	<1.26	786.1	0.4	0.6	-	2023
Other galaxies in the Virgo cluster														
VCC	Raster	FOV "	<i>tint</i> s	<i>F</i> (6.75) mJy	<i>Bg</i> (6.75) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	<i>F</i> (15) mJy	<i>Bg</i> (15) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{15}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{15}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1226	5×5	1.8	5.04	31.17 ± 41.41	55.3	0.6	0.7	3	10.76 ± 19.62	259.8	0.3	0.6	3	*
1508	2×2	4.45	5.04	158.09 ± 3.92	183.2	0.4	1.0	2	201.81 ± 10.76	1049.5	1.0	1.8	2	*
1555	4×4	8.0	5.04	1029.23 ± 37.09	169.4	0.4	0.8	1	853.78 ± 102.39	1043.4	1.0	1.8	1	
1632	5×3	15.2×3.6	1.12	180.51 ± 13.10	175.0	0.4	0.8	2	39.31 ± 25.82	986.5	0.7	1.4	3	*
1939	5×5	1.8	5.04	11.51 ± 22.13	70.0	0.4	0.5	3	3.49 ± 26.18	348.9	0.4	0.3	3	*
CGCG43041	2×2	4.45	5.04	189.20 ± 8.53	130.5	1.0	1.0	2	133.95 ± 10.12	847.5	1.1	1.7	2	*
Galaxies in the clusters A1367 and Coma														
CGCG	Raster	FOV "	<i>tint</i> s	<i>F</i> (6.75) mJy	<i>Bg</i> (6.75) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{6.75}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	<i>F</i> (15) mJy	<i>Bg</i> (15) $\mu\text{Jy arcsec}^{-2}$	$\sigma(s)_{15}$ $\mu\text{Jy arcsec}^{-2}$	$\sigma(p)_{15}$ $\mu\text{Jy arcsec}^{-2}$	<i>Q</i>	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
97062	2×2	4.2	5.04	9.60 ± 0.48	171.3	0.2	0.2	1	7.20 ± 0.86	916.7	0.4	0.4	1	
97073	2×2	4.2	5.04	5.78 ± 0.25	170.9	0.2	0.2	1	2.74 ± 0.44	911.1	0.4	0.3	1	
97079	2×2	4.2	5.04	6.40 ± 0.25	171.2	0.2	0.2	1	7.48 ± 0.44	924.0	0.4	0.4	1	
97087	2×2	4.2	5.04	50.83 ± 3.30	171.2	0.4	0.4	1	52.40 ± 6.50	919.8	0.7	0.4	1	
97087N	2×2	4.2	5.04	2.92 ± 0.10	171.2	0.2	0.4	2	2.09 ± 0.16	919.8	0.4	0.4	1	*
97138	2×2	4.2	5.04	1.62 ± 0.09	167.3	0.1	0.2	1	1.08 ± 0.37	904.9	0.6	0.4	2	
160020	2×2	4.2	5.04	15.52 ± 0.36	88.8	0.2	0.4	1	17.27 ± 0.44	528.2	0.3	0.6	1	
160026	2×2	4.2	5.04	7.89 ± 0.36	89.7	0.2	0.2	1	6.90 ± 0.44	542.8	0.3	0.6	1	
160055	2×2	4.2	5.04	41.77 ± 0.80	87.0	0.2	0.4	1	42.20 ± 0.95	513.7	0.3	0.6	1	
160067	2×2	4.2	5.04	14.30 ± 0.36	100.0	0.2	0.2	1	13.41 ± 0.43	557.7	0.3	0.4	1	
160076	2×2	4.2	5.04	2.14 ± 0.36	86.2	0.2	0.2	1	1.73 ± 0.43	558.0	0.3	0.4	1	
160086	2×2	4.2	5.04	9.18 ± 0.36	86.2	0.2	0.4	1	10.87 ± 0.44	525.1	0.3	0.6	1	
160088	2×2	4.2	5.04	19.40 ± 1.19	88.7	0.2	0.4	1	12.22 ± 1.42	520.8	0.3	0.6	1	
160095	2×2	4.2	5.04	14.08 ± 1.92	88.8	0.2	0.4	1	9.22 ± 2.27	529.2	0.3	0.4	1	
160127	2×2	4.2	5.04	3.02 ± 0.25	84.4	0.2	0.4	1	3.42 ± 0.30	503.4	0.3	0.4	1	
160128	2×2	4.2	5.04	4.82 ± 0.36	83.8	0.2	0.2	1	4.59 ± 0.22	505.4	0.1	0.3	1	
160139	2×2	4.2	5.04	3.07 ± 0.63	81.8	0.2	0.2	1	3.39 ± 0.38	502.6	0.1	0.3	1	
160252	2×2	4.2	5.04	36.86 ± 0.79	86.7	0.2	0.2	1	37.10 ± 0.95	517.9	0.3	0.4	1	
160260	2×2	4.2	5.04	67.75 ± 1.19	89.2	0.2	0.4	1	68.45 ± 1.41	530.0	0.3	0.4	1	

Table 2. continued.

Other galaxies in the Coma/A1367 supercluster														
VCC	Raster	FOV	<i>tint</i>	<i>F</i> (6.75)	<i>Bg</i> (6.75)	$\sigma(s)_{6.75}$	$\sigma(p)_{6.75}$	<i>Q</i>	<i>F</i> (15)	<i>Bg</i> (15)	$\sigma(s)_{15}$	$\sigma(p)_{15}$	<i>Q</i>	Notes
(1)	(2)	(3)	(4)	mJy (5)	$\mu\text{Jy arcsec}^{-2}$ (6)	$\mu\text{Jy arcsec}^{-2}$ (7)	$\mu\text{Jy arcsec}^{-2}$ (8)	(9)	mJy (10)	$\mu\text{Jy arcsec}^{-2}$ (11)	$\mu\text{Jy arcsec}^{-2}$ (12)	$\mu\text{Jy arcsec}^{-2}$ (13)	(14)	(15)
159072N	2×2	2.1	2.1	65.54 ± 2.97	35.4	0.6	0.5	1	68.82 ± 5.62	166.5	1.1	0.7	1	*
159072S	2×2	2.1	2.1	11.23 ± 2.05	35.4	0.6	0.5	1	11.96 ± 3.87	166.5	1.1	0.7	1	*
130023	2×2	4.45	5.04	28.69 ± 0.80	113.9	0.5	0.5	2	63.58 ± 1.42	602.6	0.9	0.9	2	*

Notes:

 $\sigma(s)_i$ and $\sigma(p)_i$ are given in units of mJy per 6''×6'' pixel.

VCC 890: in the same frame of VCC 899.

VCC 1508: at 15 μm *tint* = 2.1 s.VCC 1632: at 15 μm *tint* = 2.1 s.

VCC 1673: in the same frame of VCC 1676.

VCC 1676: in the same frame of VCC 1673.

VCC 1686: the given value is the average value obtained from the pointed observation of VCC 1686 and that extracted from the image of the nearby VCC 1690.

VCC 1929: in the same frame of VCC 1932.

VCC 1932: in the same frame of VCC 1929.

VCC 1226: images taken with a pixel size of 3 arcsec.

VCC 1939: images taken with a pixel size of 3 arcsec.

CGCG 43041: at 15 μm *tint* = 2.1 s.

CGCG 97087N: serendipitously detected in the frame of CGCG 97087.

CGCG 159072N and S: in the same frame, obtained with a pixel size of 3 arcsec.

CGCG 130023: at 15 μm *tint* = 2.1 s.

Table 4. Parameters of the resolved galaxies.

VCC	$C_{31}(6.75)$	$r_5(6.75)$	$R_e(6.75)$	$\mu_e(6.75)$	$C_{31}(15)$	$r_5(15)$	$R_e(15)$	$\mu_e(15)$
		"	"	$\mu\text{Jy arcsec}^{-2}$		"	"	$\mu\text{Jy arcsec}^{-2}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
66	3.02	111	78	16	2.58	104	78	18
92	3.85	-	90	46	2.28	194	112	40
460	7.26	75	34	66	5.16	54	13	323
655	1.98	20	12	39	1.87	19	13	20
692	2.99	26	15	34	2.65	21	11	31
836	4.91	65	21	422	4.21	66	11	2117
857	3.19	55	91	6	3.35	54	114	05
873	2.84	76	43	126	2.90	76	41	120
912	3.20	34	15	56	5.26	28	18	44
984	5.48	17	50	4	2.98	-	43	1
1002	1.73	44	34	18	1.69	43	36	12
1003	7.07	86	48	40	11.45	46	72	15
1043	5.13	54	24	121	4.75	53	21	106
1110	3.19	79	56	22	2.99	90	60	21
1158	6.94	25	20	41	2.99	13	171	1
1253	5.01	32	132	3	4.71	18	16	21
1379	1.80	53	43	18	2.12	44	39	14
1552	3.53	26	28	10	3.21	24	23	11
1554	2.75	-	24	117	2.82	-	21	159
1555	2.95	151	102	38	2.51	142	88	49
1673	1.91	63	31	70	2.57	-	27	87
1676	3.57	-	37	231	3.72	-	35	279
1690	3.36	107	64	60	5.12	96	61	70
1727	2.80	107	77	25	3.13	109	68	31
1811	2.74	36	19	31	2.85	34	19	28
1813	5.34	54	36	8	8.23	23	47	45
1929	3.20	28	23	15	2.81	29	19	18
1932	2.67	55	26	131	2.60	58	26	152
1972	2.67	-	33	92	2.78	74	31	96
1978	5.27	-	72	27	6.71	-	77	10
1987	2.41	113	56	104	2.62	115	57	99
2058	2.39	75	37	51	2.43	78	38	50
2066	2.44	24	10	122	2.34	23	10	112
2070	5.30	52	65	8	2.67	53	170	3

Table 5. Supplementary parameters of the observations.

The ISO Virgo sample			
Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
VCC 1	LW2,LW3	22600301	21.2600
VCC 4	LW2	23501217	18.5900
VCC 4	LW3	23501149	18.6000
VCC 17	LW2	23501218	18.9000
VCC 17	LW3	23501150	18.9100
VCC 24	LW2,LW3	23501902	19.7500
VCC 26	LW2	23501216	18.8300
VCC 26	LW3	23501148	18.8400
VCC 66	LW2,LW3	22701301	21.6700
VCC 81	LW2	23501219	18.8800
VCC 81	LW3	23501151	18.8900
VCC 87	LW2	23501220	18.6600
VCC 87	LW3	23501152	18.6700
VCC 92	LW2,LW3	19900303	28.0100
VCC 130	LW2	23901022	19.7500
VCC 130	LW3	23900954	19.7500
VCC 152	LW2	23900808	19.8200
VCC 152	LW3	22700934	21.9800
VCC 159	LW2	22802524	22.0000
VCC 159	LW3	22802456	22.0100
VCC 169	LW2	23901021	19.8000
VCC 169	LW3	23900953	19.8000
VCC 171	LW2	22802525	21.9900
VCC 171	LW3	22802457	22.0000
VCC 207	LW2	22802523	22.0600
VCC 207	LW3	22802455	22.0700
VCC 318	LW2	23900809	20.1100
VCC 318	LW3	22700935	22.1800
VCC 425	LW2	22802526	22.0100
VCC 425	LW3	22802458	22.0200
VCC 459	LW2,LW3	23401803	18.6100
VCC 460	LW2	23401976	18.3700
VCC 460	LW3	23500583	18.1200
VCC 655	LW2	23401910	18.7600
VCC 655	LW3	23500536	18.5100
VCC 664	LW2	22701411	21.7800
VCC 664	LW3	23100537	20.8900
VCC 666	LW2,LW3	23402404	18.9000
VCC 692	LW2	22701412	21.8300
VCC 692	LW3	23100538	20.9500
VCC 809	LW2,LW3	23502005	19.9800
VCC 836	LW2	22701477	21.8300
VCC 836	LW3	23100584	20.9200
VCC 848	LW2,LW3	22801006	22.5600
VCC 857	LW2	23401960	18.6800
VCC 857	LW3	23500568	18.4200
VCC 873	LW2	22701461	21.7800
VCC 873	LW3	23100569	20.8300
VCC 890/9	LW2,LW3	22801514	22.4600
VCC 912	LW2	22701413	21.8700
VCC 912	LW3	23100539	20.9500
VCC 971	LW2	22801315	22.5700
VCC 971	LW3	22701141	22.6800
VCC 984	LW2	22701462	21.8800
VCC 984	LW3	23100570	20.9500
VCC 995	LW2,LW3	23901207	19.5500
VCC 1002	LW2	22801314	22.5300
VCC 1002	LW3	22701140	22.6500
VCC 1003	LW2	23100990	21.2100
VCC 1003	LW3	23600292	20.1500
VCC 1043	LW2	23501494	19.8900
VCC 1043	LW3	22600995	22.1500
VCC 1047	LW2	23501421	20.0700
VCC 1047	LW3	22600947	22.2300
VCC 1110	LW2	23402178	19.1100
VCC 1110	LW3	23402285	19.1000
VCC 1158	LW2	22600465	22.2300
VCC 1158	LW3	22600573	22.2200
VCC 1189	LW2	22801316	22.5100
VCC 1189	LW3	22701142	22.6400
VCC 1196	LW2	22600422	22.1500
VCC 1196	LW3	22600548	22.1400
VCC 1217	LW2	23100917	21.2200
VCC 1217	LW3	23600243	20.1300
VCC 1253	LW2	22600464	22.2300
VCC 1253	LW3	22600572	22.2200
VCC 1257	LW2,LW3	23402008	19.1200
VCC 1326	LW2	23100918	21.2400
VCC 1326	LW3	23600244	20.1400

Table 5. continued.

Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
VCC 1368	LW2	23100919	21.2400
VCC 1368	LW3	23600245	20.1200
VCC 1379	LW2	23402163	19.3300
VCC 1379	LW3	23402271	19.3200
VCC 1410	LW2,LW3	23402509	19.3400
VCC 1412	LW2	23100920	21.3300
VCC 1412	LW3	23600246	20.2400
VCC 1419	LW2	22600423	22.3500
VCC 1419	LW3	22600549	22.3400
VCC 1450	LW2	22600424	22.3000
VCC 1450	LW3	22600550	22.3000
VCC 1552	LW2	22601467	22.3700
VCC 1552	LW3	22600675	22.4600
VCC 1554	LW2	22701227	22.7700
VCC 1554	LW3	22801453	22.6300
VCC 1569	LW2,LW3	22601110	22.3600
VCC 1575	LW2	22701228	22.7200
VCC 1575	LW3	22801454	22.5800
VCC 1581	LW2	22802028	22.6300
VCC 1581	LW3	22801960	22.6300
VCC 1596	LW2,LW3	22802633	22.4500
VCC 1673/6	LW2,LW3	23501602	20.5600
VCC 1675	LW2	22802034	22.5200
VCC 1675	LW3	22801966	22.5200
VCC 1678	LW2	22701226	22.8100
VCC 1678	LW3	22801452	22.6600
VCC 1686	LW2	22601466	22.4700
VCC 1686	LW3	22600674	22.5700
VCC 1690	LW2,LW3	22600704	22.5700
VCC 1699	LW2	22701229	22.7900
VCC 1699	LW3	22801455	22.6500
VCC 1725	LW2	22802032	22.5100
VCC 1725	LW3	22801964	22.5100
VCC 1726	LW2	22802027	22.6300
VCC 1726	LW3	22801959	22.6300
VCC 1727	LW2,LW3	23501305	20.5000
VCC 1730	LW2	22701230	22.9000
VCC 1730	LW3	22801456	22.7700
VCC 1750	LW2	22801629	22.6600
VCC 1750	LW3	22801861	22.6600
VCC 1757	LW2	22601425	22.5300
VCC 1757	LW3	22600651	22.6200
VCC 1758	LW2	22801630	22.6000
VCC 1758	LW3	22801862	22.5900
VCC 1784	LW2	23402736	19.9300
VCC 1784	LW3	23500768	19.7600
VCC 1789	LW2	24100938	20.9300
VCC 1789	LW3	24101070	20.9300
VCC 1791	LW2	22802035	22.6000
VCC 1791	LW3	22801967	22.6000
VCC 1804	LW2,LW3	23600411	20.8200
VCC 1811	LW2,LW3	23500807	19.8600
VCC 1813	LW2	23901179	20.0100
VCC 1813	LW3	23901179	20.0100
VCC 1822	LW2	22801631	22.7200
VCC 1822	LW3	22801863	22.7100
VCC 1869	LW2	23500980	19.9500
VCC 1869	LW3	23500980	19.9500
VCC 1885	LW2	23402737	20.0000
VCC 1885	LW3	23500769	19.8300
VCC 1918	LW2	24100939	20.7100
VCC 1918	LW3	24101071	20.7100
VCC 1929/32	LW2	22600206	22.8300
VCC 1929/32	LW3	22600206	22.8300
VCC 1952	LW2	24300141	19.9000
VCC 1952	LW3	23503173	21.3600
VCC 1970	LW2	23503042	20.9300
VCC 1970	LW3	23502974	20.9300
VCC 1972	LW2	24101391	19.1000
VCC 1972	LW3	22601693	22.9000
VCC 1987	LW2	24101381	18.6400
VCC 1987	LW3	22601688	22.8200
VCC 1992	LW2,LW3	22601745	22.8900
VCC 1999	LW2	22601333	22.8400
VCC 1999	LW3	22601259	22.8500

Table 5. continued.

Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
VCC 2006	LW2	24101331	18.9000
VCC 2006	LW3	22601657	22.9100
VCC 2007	LW2	24300140	19.7900
VCC 2007	LW3	23503172	21.3100
VCC 2023	LW2	22601332	22.9100
VCC 2023	LW3	22601258	22.9200
VCC 2033	LW2,LW3	24300212	19.6900
VCC 2034	LW2	23503043	20.9900
VCC 2034	LW3	23502975	20.9900
VCC 2037	LW2	23503044	20.9800
VCC 2037	LW3	23502976	20.9900
VCC 2058	LW2	22601382	23.0000
VCC 2058	LW3	22601289	23.0100
VCC 2066	LW2	24300377	19.0000
VCC 2066	LW3	24300478	18.9900
VCC 2070	LW2,LW3	24101613	20.0200
VCC 2087	LW2	24300315	19.0800
VCC 2087	LW3	24300447	19.0800
VCC 2094	LW2,LW3	24300546	19.2400
Galaxies in the clusters A1367 and Coma			
Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
97062	LW2,LW3	22201301	19.4100
97073	LW2,LW3	22201102	19.4600
97079	LW2,LW3	22201303	19.4600
97087	LW2,LW3	22201104	19.5100
97138	LW2,LW3	22201606	19.6000
160020	LW2,LW3	21501131	28.0000
160026	LW2,LW3	21501132	28.0300
160055	LW2	61000240	13.5000
160055	LW2,LW3	21400934	28.8200
160067	LW2,LW3	22803435	21.8100
160076	LW2,LW3	21400936	29.0400
160086	LW2,LW3	21400937	29.0900
160088	LW2,LW3	21500866	28.6400
160095	LW2	61700846	9.78000
160095	LW2,LW3	21500968	28.6700
160095	LW3	61700747	9.79001
160127	LW2,LW3	21401169	29.5000
160128	LW2,LW3	21401170	29.5900
160139	LW2,LW3	21401171	29.8800
160252	LW2,LW3	21500865	28.6000
160252	LW3	61600443	10.2600
160260	LW2,LW3	21500967	28.6100
Other galaxies in the Virgo cluster			
Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
1226*	LW2,LW3	22700815	22.5500
1508	LW2,LW3	23600326	20.8700
1555	LW2,LW3	23100103	21.9800
1632	LW2,LW3	23902129	19.2100
1939*	LW2,LW3	39600117	-155.150
CGCG43041	LW2,LW3	22500757	23.4300
Other galaxies in the Coma/A1367 supercluster			
Target name (1)	Filter (2)	ISO TDT number (3)	Raster orientation (4)
159072N,S*	LW2,LW3	24602014	9.56000
130023	LW2,LW3	24300658	16.6300

Notes:

Galaxies marked with an asterisk have been observed at high resolution with a pixel size of 3 arcsec

Fig. 1. The gray-scale level images at 6.75 μm (left) and 15 μm (centre) of the 34 resolved galaxies; contours are at 2, 4, 6, 8, 12 (black), 20, 30, 40, 60, 100 (white) $\mu\text{Jy arcsec}^{-2}$ (coordinates are J2000). Radial (6.75 and 15 μm) and colour profiles (6.75/15 μm ratio) of each galaxy, obtained integrating along elliptical annuli, are given in the right side panel. A vertical dashed line in the colour profile indicates the 8 arcsec diffraction limit of the 15 μm image.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 1. continued.

Fig. 2. The contour level images of galaxies detected with a surface brightness brighter than $2 \mu\text{Jy arcsec}^{-2}$. For each galaxy, the left image is at $6.75 \mu\text{m}$ and the right one at $15 \mu\text{m}$; as for the images of the fully resolved galaxies, contours are at 2, 4, 6, 8, 12, 20, 30, 40, 60, 100 $\mu\text{Jy arcsec}^{-2}$ (coordinates are J2000).

Fig. 2. continued.

Fig. 2. continued.

Fig. 2. continued.

Fig. 2. continued.