Astronomy & Astrophysics: Author's guide
Beta version, july 2006

July 26, 2006

Contents

1 General remarks

Astronomy & Astrophysics publishes new results of astronomical and astrophysical research. Details about the current A&A editorial policy can be found in the editorial published in A&A 420(3), E1-E14 (2004).

Manuscripts submitted for publication to A&A should not be submitted to any other refereed journal, but can be sent to preprint servers such as astro-ph. By submitting a manuscript to A&A, the corresponding author explicitly states that the work is original and that all co-authors have read the manuscript and agree with its contents. A&A Editors expect to be informed when a submitted manuscript has previously been rejected by another Journal.

1.1 Manuscript categories

There are different kinds of manuscripts published in A&A, all of them must be written in English and formatted in LaTeX2e using the current A&A macro package[1]. Submissions and manuscript follow-up are made via the A&A on-line manuscript management system (See Sect. 4).

Letters to the Editor

Important new results that require rapid publication can be submitted as Letters, which are restricted in length to 4 printed pages. Letters are usually published within 4–8 weeks of acceptance.

Regular papers

Regular papers submitted to A&A should present new astronomical results or ideas of sufficient interest to the community as concisely as possible.

[1] Instructions to download and install the A&A macro package are available at ftp://ftp.edpsciences.org/pub/aa/readme.html

Research Notes

Research notes are short papers that contain either new results as an extension of work reported in a previous paper, or limited observations not urgent enough to be published as a Letter, or useful calculations that have no definite immediate astrophysical applications.

Other submissions

Errata concerning published A&A papers must be sent directly to the editorial office for consideration by the Editor in Chief.

Comments are usually not published by A&A, except in exceptional cases. Three conditions are necessary for a comment to be considered for publication (a) it refers to a paper published by A&A, (b) it does unambiguously solve the problem or question it raises, and (c) its publication will be useful to the community. Comments should also be sent directly to the editorial office.

1.2 About the language

Most papers in A&A have been written by non-native English speakers. Those authors with a limited experience of English are strongly recommended to find help in writing their papers, preferably from a native-speaking colleague. It is the policy of A&A to hold the authors responsible for a correct formulation of their text. A&A offers help, but only after the scientific content of a manuscript has been judged to be sufficient for publication, so it should be understandable before it goes to a referee. If necessary the Editor will send back poorly written submissions to the author with a request for an initial revision of the language by a native English speaker.

1.3 Structure of a paper

Most scientific papers have the same structure:

- Introduction
- Observations or calculations or mathematical derivations
- Results
- Discussion
- Conclusions

This is a well-tried format; authors should have good reasons for deviating from it. The goal of a scientific paper is not to impress the readers by poetic language but to transfer facts and new insights as lucidly as possible.

The first page of a manuscript contains: A title, the authors' names, the addresses of authors' institution, an abstract and six keywords at most.

All this information is also entered in the manuscript management system at submission time. Authors are asked at the same time to suggest the section of the Journal in which the paper will appear.

1.4 The A&A sections

The current A&A sections are as follows.

1. Letters
2. Astrophysical processes
3. Cosmology (including clusters of galaxies)
4. Extragalactic astronomy
5. Galactic structure, stellar clusters and populations

6. Interstellar and circumstellar matter
7. Stellar structure and evolution
8. Stellar atmospheres
9. The Sun
10. Planets and planetary systems
11. Celestial mechanics and astrometry
12. Atomic, molecular and nuclear data
13. Instruments, observational techniques, and data processing
14. On-line catalogs and data

Note concerning papers submitted for Section 13

It is required that papers describing existing instruments and/or observational procedures contain a significant amount of new results obtained with the instrument or technique described. The Editors are generally reluctant to consider papers of purely instrumental nature unless they fulfill at least one of two criteria: (a) be of interest to a large part of the community or (b) report a significant advance in instrumentation. These papers should be written as concisely as possible, and details should appear in appendices to be published in the electronic version of the journal.

2 How to prepare a manuscript: general guidelines

Here, we give some general guidelines concerning the style of the most important elements of a paper. More details and instructions for the LaTeX implementation of these elements are given in the following section, and stylistic considerations are reviewed in Sect. B.

2.1 The title

Make the title short and communicative; do not use acronyms, except those that are in general use; avoid acronyms known only to those deeply specialized.

2.2 The abstract

The abstract should be short but informative. Sometimes this is difficult to achieve as these two criteria contradict each other to some extent. The abstract should give in a few lines the essence of the results. A good abstract eliminates to a large extent the need for the section with conclusions at the end of the paper.

A&A encourages the use of structured abstracts (see the editorial published in A&A 441, E3-E6). Just like a traditional abstract, a structured abstract summarizes the content of the paper, but it does make the structure of the article explicit and visible. For doing so, the structured abstract uses headings that define several short paragraphs. Three paragraphs, entitled respectively “Aims”, “Methods”, and “Results”, are mandatory. When appropriate, the structured abstract may use an introductory paragraph entitled “Context”, and a final paragraph entitled “Conclusions”.

The objectives of the paper are defined in “Aims”, the methods of the investigation are outlined in “Methods”, and the results are summarized in “Results”. The heading “Context” is used when needed to give background information on the research conducted in the paper, and “Conclusions” can be used to explicit the general conclusions that can be drawn from the paper.

2.3 The introduction

The introduction should state clearly why the study was started and place the research in a broad context e.g. by referring to previous work of relevance. The introduction should not contain the conclusions. Some authors tend to expand an introduction into a review paper by itself; this should be avoided; it is better to refer to papers in the well-established review journals. At the end of the introduction the outline of the paper may be described.

2.4 Figures

Figures demonstrate and prove conclusions. They should convince the reader, preferably at first glance. Figures should be self-explanatory. The legends should have a well-defined meaning. The figure captions should contain all the information needed to understand the data presented, and this information should not be repeated in the text. However, the scientific discussion of the figure content should be made in the body of the paper, not in the caption.

3 How to prepare your manuscript: your TEX file

As the articles for the A&A will be available online in different formats – one of these is full-text-searchable hyper-text – we strongly suggest you strictly obey the LATEX conventions.

The A&A document class was derived from the LATEX 2_ε `article.cls` based on TEX version 3.141 and LATEX 2_ε. Hence formulas and text are typed using the standard LATEX 2_ε commands. The standard sectioning commands are also kept. Using `aa.cls` with other versions or implementations may cause difficulties. If this is the case, please contact us and we will try to help you.

Please refrain from using any self-made definitions since these will get lost during further conversion of your text. If you use typing abbreviations, "search and replace" them before submitting your article to the publisher.

3.1 The preamble of your TEX file

3.1.1 Loading the class: various A&A layouts

`\documentclass{aa}`

To get the standard A&A printer layout (i.e. single-line spacing), you have to include this command at the beginning of your article.

`\documentclass[referee]{aa}`

Both for refereeing purposes and, after acceptance, for language editing purposes, the authors are requested to send their article in "Referee format", i.e. with a special double-line spacing layout. To set this class option, please include the `referee` *option. This special layout also provides a list of all astronomical objects indexed with the* `\object` *command (see Sect. 3.9).*

`\documentclass[rnote]{aa}`

There is a special layout for Research Notes. The mention "(Research Note)" is automatically added in the title, as well as "(RN)" in the running title

`\documentclass[letter]{aa}`

There is a special layout for Letters. The mention "Letter to the Editor" is automatically added.

`\documentclass[longauth]{aa}`

In articles that are the result of consortia, the number of authors and the list of affiliations are very long. With the `longauth` *option, all the institutes are set below the references.*

`\documentclass[onecolumn]{aa}`

Some papers contain a lot of large mathematical formulae which are sometimes not easily readable and cannot be written in a 2-column format. In this case, the authors can submit their articles using the option `onecolumn`*. After the submission, the editors will confirm if the article will actually be printed on 1 column, right across the page.*

3.1.2 TX fonts

A&A is printed using the Postscript `TX` Times-fonts. The `TX` fonts consist of virtual text roman fonts using Adobe Times with some modified and additional text symbols. The `TX` fonts are distributed under the GNU public license and are available in the distributions of LaTeX since December 2000.

```
\documentclass{aa}
\usepackage{txfonts}
...
\begin{document}
```

As the use of the `TX` fonts results in a slightly different page make-up from `CM` fonts, we encourage you to use `TX` fonts, following this example.

3.2 The manuscript header

3.2.1 Title

Make the title short and communicative; do not use acronyms, except those that are in general use; avoid acronyms known only to those deeply specialized. The main title and the subtitle should not be capitalised, except for the first letter and any other words that are always capitalised. Math variables and symbols should be typeset as in the text.

In the manuscript TeX file, please code the title and subtitle of your article as follows.

```
\title{<your title>}
\subtitle{<your subtitle>}
```

If a long `\title` or `\subtitle` needs to split across two or more lines, please insert linebreaks (`\\`).

3.2.2 Authors and addresses

For every manuscript, all authors and all addresses should be listed. Addresses should contain e-mail addresses where possible. A number should precede each address and the authors' names should be marked with the appropriate numerical superscript(s). Unless the authors request otherwise, the e-mail addresses will be included in the affiliation to facilitate information exchange between readers and authors.

Names of authors The preferred form for each name is: initial(s) of the forename(s) followed by the family name.

```
\author{<first author's name>
\and <second author's name> }
\and <third author's name>... }
```

If there is more than one author, the order is optional. The names should be separated by `\and`. If the authors have different affiliations, each name has to be followed by `\inst{<number>}`. Numbers referring to different addresses should be attached to each author, pointing to the corresponding institute.

Addresses

```
\institute{<name of the first
institute>
\and <name of the second
institute> ...}
```

If there is more than one address, the entries are numbered automatically with `\and`, in the order in which you type them. Please make sure that the numbers match those placed next to the authors' names.

In the case of large collaborations involving several tens of authors, a special formatting of the authors' list is requested in order to save space. With the `longauth` option, all the institutes are set below the references (see section 3.1.1) .

3.2.3 Footnote to the title block

```
...\thanks{<text of footnote>}
```

If footnotes to the title, subtitle, author's names or institute addresses are needed, please use `thanks` immediately after the word where the footnote indicator should be placed.

These footnotes are marked by asterisks (*). If you need more than one consecutive footnote, use `\fnmsep` to typeset the comma separating the asterisks (see an example in the file `aa.dem` available in the macro package).

3.2.4 Dates of receipt and acceptance

Enter the receipt and acceptance dates as follows:

```
\date{Received <date> /
      Accepted <date>}
```

The date is in format "day month year" (e.g. `1 January 2005`*).*

The proper receipt and acceptance dates of your manuscript will be set by the editors and inserted by the publisher.

3.2.5 Abstract

A new concept "Structured Abstract" is implemented with the version 6.0 of the A&A macro package. Just like a traditional abstract, a structured abstract summarises the content of the paper, but it does make the structure of the article explicit and visible. For doing so, the structured abstract uses headings that define several short paragraphs. Three paragraphs, entitled respectively Aims, Methods, and Results, are mandatory. When appropriate, the structured abstract may use an introductory paragraph entitled Context, and a final paragraph entitled Conclusions.

Proceed as follows:

```
\abstract
{}{}{}{}{}
```

The second, third and fourth arguments have to be completed. The first one and the last one might be left empty.

For example:

```
\abstract {} {Text of aims} {Text of methods} {Text of results} {}
```

The abstract should accurately summarise the paper's content, be limited to 300 words, and be self-contained (no references, no abbreviations or acronyms except for the truly obvious and familiar ones). A counter of words has been added with an error message for an abstract exceeding 300 words. Citations in an abstract display an error message. Please note that `abstract` is a command with 5 arguments, and not an environment. **Remark** : to ensure the portability of articles written with previous versions and a non-structured abstract, an option `\documentclass[oldversion]{aa}` has been added.

3.2.6 Key words

A maximum of 6 key words should be listed after the abstract. These must be selected from a list that is published each year in the first issue in January and is also available in Appendix **??** or at This list is common to the major astronomical and astrophysical journals.

In your TEX file, the key words should read as follows:

```
\keywords{<keyword 1 - keyword 2 - keyword 3>}}
```

3.2.7 Formatting the header and the running title

Having entered the commands described above to set the title block of the article, please format the complete heading of your article by typing:

```
\maketitle
```

If you leave it out, the work done so far will produce no text. The command `\maketitle` will automatically generate the running title, derivating it from the author and title inputs. If the title is too long for the space available, you will be asked to supply a shorter version. In this case, enter before `\maketitle` :

```
\titlerunning{<short title>}
\authorrunning{<name(s) of
author(s)}
```

If there are two authors, both names, separated by an ampersand (&, coded as \&), should be given; if there are more than two authors, the name of the first plus "et al."should be given. The title should be shortened to a maximum of about 60 characters, spaces ignored, following the wording of the original title as closely as possible. If a paper has a numbered subtitle, the main title (length permitting) should be given, followed by the roman numeral of the subtitle.

The Editors reserve the right to modify the running head suggested by the authors, should this be necessary.

The required style is illustrated below (the colon will be inserted by the macro):
N. Copernicus: How active is NGC 4258?
E. Hertzsprung & E.P. Hubble: Optical spectroscopy of WR stars in M33 and M31. II
A.S. Eddington et al.: Infrared lines as probes of solar magnetic features. IV
C. Barbieri et al.: (RN) First HST/FOC images of the low mass companion of the astronomic binary Gliese 623

Appendix A.1 provides an example of a manuscript header coded with LaTeX.

3.3 The main text

Manuscripts should be divided into numbered sections and subsections, starting with "1. Introduction". Subsections should be numbered 2.1, 2.2, 3.1, etc. All sections must have a short descriptive title. In the TeX file, the sections appear as follows.

```
\section{Title}
\subsection{Title}
\subsubsection{Title}
\paragraph{Title}
```

3.3.1 Cross-referencing

Please always give a `\label` where possible (figures, tables, section) and use `\ref` for cross-referencing. Such cross-references will be converted to HTML hyper-links. The `\cite`- and `\bibitem`-mechanism for bibliographic references as well as the `\object` command is also mandatory.

3.3.2 Acknowledgements

A special section for acknowledgements may be included before the References list. It will appear as follows:

```
\begin{acknowledgements} ... \end{acknowledgements}
```

3.3.3 Some aspects of typographic style within the text

The following expressions should always be abbreviated unless they appear at the beginning of a sentence (i.e. Sect., Sects., Fig., Figs., Col., Cols.). Table is never abbreviated.
Abbreviations of concepts, methods, instruments, observatories, etc may be used throughout the text, but the full wording followed by the abbreviation in parentheses should be given once in the Abstract (if appropriate) and/or once when first mentioned in the main text (usually in the Introduction).
Examples: ...very long baseline interferometry (VLBI)...; ... Westerbork Radio Telescope (WRT)...

3.4 Figures

Figures submitted to the Journal must be of the highest quality to ensure accuracy and clarity in the final published copy. We urge the author to limit the empty space in and around figures. Artwork should be in sharp focus, with clean, clear numbers and letters and with sharp black lines. Thin lines should be avoided, particularly in figures requiring considerable reduction. Authors should check whether laser-printed originals of these figures are acceptable (especially for greyscale).

The author is warned that changes in the size and arrangement of figures can made by the publisher at the production stage. Because of the bulk of the Journal, the production office will reduce most figures to fit a one-column format (88 mm). If necessary, figures may extend across the entire page width (max. 180 mm). Intermediate widths with a side caption are also possible (max. 120 mm). The illustrations should be placed at the top of the column and flush-left according to layout conventions.

If lettered parts of a figure (e.g., 1a, 1b, 1c, etc.) are referred to in the figure legend, each part of the figure should be labeled with the appropriate letter within the image area. Symbols should be explained in the caption and not in the figure.

See appendix A.2 for examples of how figures should be coded in the LaTeX file.

For figures only available in the electronic edition of the Journal, a footnote to the main title of the article should be added as follows:

```
\title{Optimality relationships
  \thanks{Figures 5-10 are only available in electronic form via
          http://www.edpsciences.org} }
```

3.4.1 About PostScript format

For the graphics to be manipulated readily and reliably, they should be sent as encapsulated PostScript files. Some software packages leave a considerable margin around the `.eps` figures. You may have to adjust the `BoundingBox` by hand with the help of `ghostview`, for example. It can be automatically changed using the `psfixbb` command that you will find on almost any FTP server.

The easiest way to include your .eps files is by using the `graphicx` package, which comes along with the standard LaTeX 2_ε distribution.

See the document by Keith Reckdahl "Using Imported Graphics in LaTeX2e", which explains how to use imported graphics in LaTeX2e documents.

```
ftp://ftp.tex.ac.uk/tex-archive/info/epslatex
ftp://ftp.dante.de/tex-archive/info/epslatex
```

3.4.2 About figures printed in colour

Colour figures are printed in greyscale, unless printing in colour is specifically requested by the authors. Colour figures appear in the online edition free of charge. The extra charge (without VAT) for colour printing is: 250 euros per figure for one or two figures, 180 euros per figure for more than three figures. The author should submit high-quality colour prints that show the colours desired for reproduction and that are suitable for scanning if the electronic file is unusable. The EPS (or PS) files need to be prepared as channeled CMYK (cyan, magenta, yellow, black) files rather than RGB (red, green, blue) files. Most computer-generated figure files are created using the RGB colour model, which is used for computer monitors, but printers use the CMYK system (the four-colour process). Colour figures prepared as RGB EPS files can be converted to CMYK; but because the available colour gamut in the RGB model is much larger than the gamut available in the CMYK model, it is very difficult, and sometimes impossible, to obtain the same result in both formats. Note that all hard copies produced from RGB files by desktop colour or laser printers can also create colours outside of the range of the CMYK palette.

The publisher can convert your RGB figures to CMYK, and a colour proof (or PDF file) of the resulting figures will be sent to the authors to verify that the CMYK colour scheme is acceptable. If not, authors will have to send again new CMYK figures to the publisher. Please note that the publisher needs a hard copy of the colour figure(s). Colour figure files, when only used in the electronic edition, may be submitted as RGB files.

3.5 Tables

Tables should be prepared using the `table` environment, following the examples given below.

Tables should be self-explanatory. The table headings should contain the essential information needed to understand the data presented. Details should not clutter the header and are better presented as explanatory footnotes. Large tables containing primary data can be archived at the CDS. For details about archival at the CDS, please refer to Sect. 3.8.1

Table columns should be set flush left. Vertical lines are normally not necessary and should be inserted only in exceptional cases for the sake of clarity. The height of each table, including the caption, usually must not exceed 23.5 cm, and the caption should always be placed above the table.

Detailed examples of TeX code for tables are provided in the appendix: see appendix A.2.2 for simple A&A tables and appendix **??** for tables longer than one page.

3.6 References

3.6.1 The reference list

The reference list should contain all the references cited in the text, ordered alphabetically by surname (with initials following). If there are several references to the same first author, they should be entered according to the following scheme:

1. One author: chronologically
2. Author, one co-author: alphabetically by co-author, then chronologically
3. Author, two or more co-authors: chronologically.

Please note that for papers that have more than five authors, only the first three should be given, followed by "et al."

To set the reference list in the proper A&A format, we encourage you to use BibTeX and the `natbib` package instead of the standard `thebibliography` environment.

How to use BibTeX for A&A For extensive description of the general use of BibTeX, please see for example The LaTeX Companion p.757 (Franck Mittelbach and Michel Goosens, second edition).

To use BibTeX, you must:

1. **Create a database (`.bib`) file that describes the articles or books you want to reference.** The NASA Astrophysics Data System (ADS) provides automatic tools for retrieving a `.bib` file including entries for a selection of articles. An example of a typical `.bib` file is also provided in the A&A LaTeX macro package.
2. **Specify the style and location of the bibliography in your TeX document.** The A&A package includes a style file `aa.bst` that will format your reference list in the proper A&A format. Before running BibTeX you must ensure that the requested files (i.e. `bib`, `bst` and `sty` files) are in the same directory as your TeX files.
3. **Run BibTeX then run LaTeX.** Remember you must run LaTeX twice to update the citations.

In the TeX file, the references list is enclosed as follows:

```
\documentclass{aa}
...
\usepackage{natbib}
\bibpunct{(}{)}{;}{a}{}{,} % to follow the A&A style
...
% for the bibliography, at the end
\bibliographystyle{aa} % style aa.bst
\bibliography{Yourfile} % your references Yourfile.bib
\end{document}
```

3.6.2 Citations in the text

References are normally cited in the text by placing the name(s) and the year in parentheses, without any comma between them. If there are two authors for one citation, both names should be given, separated by an ampersand (&). If there are more than two authors, only the first name should be given, followed by "et al.". Commas should be used only to separate two or more years linked with one author (author group). If two or more citations are made in one set of parentheses, they should be separated by a semi-colon. If more than one citation for a particular author (author group) is made for the same year, "a", "b", "c", etc. should be added to the year. If citations are made within the normal running text, only the year(s) should be placed in parentheses. The following examples illustrate the required style:

(Copernicus 1986)
(Copernicus & Galilei 1988)
(Hubble et al. 1985; Newton et al. 1987; Ptolemaus & Copernicus 1988a, 1988b, 1992)
Recently Galilei et al. (1991, 1992) showed that . . .

Authors' initials are permitted only in exceptional cases, for example, to distinguish between two authors with the same surname. Each literature citation made in the text should have a corresponding entry in the *References* at the end of the paper. For frequently cited papers, an abbreviated form of citation is recommended, e.g., Paper I, Paper II (if appropriate) or by the initial letters of the authors' surnames.

The `Natbib` package provides citation commands that automatically format the citations in the proper format. The command `\citet` is to be used for textual citations, while the command `\citep` is to be used for parenthetical citations. Some examples are given below.

`\citet{jon90}`	⇒	Jones et al. (1990)
`\citep{jon90}`	⇒	(Jones et al. 1990)
`\citep[see][]{jon90}`	⇒	(see Jones et al. 1990)
`\citep[see][chap.~2]{jon90}`	⇒	(see Jones et al. 1990, chap. 2)

Multiple citations can be made as usual, by including more than one citation key in the `\cite` command argument.

`\citet{jon90,jam91}`	⇒	Jones et al. (1990); James et al. (1991)
`\citep{jon90,jam91}`	⇒	(Jones et al., 1990; James et al. 1991)
`\citep{jon90,jon91}`	⇒	(Jones et al. 1990, 1991)
`\citep{jon90a,jon90b}`	⇒	(Jones et al. 1990a,b)

3.7 Appendices

The appendices will be included after the reference list.

In the LaTeX file, appendix sections should appear as follows:

```
\begin{appendix}
\section{Title of the first
appendix}
...
\end{appendix}
\begin{appendix}
\section{Title of the second
appendix}
...
\end{appendix}
```

The command `\begin{appendix}` *must be entered before the first appendix. All sections that follow will be numbered with capital letters.*

3.8 Online material

3.8.1 Publishing data at the CDS

By contract with the Journal, the CDS archives the primary data that are published in A&A and puts them at the disposal of the global community. The data are also linked to the general purpose data-mining tools developed at the CDS. These archived data can be primary observational material, catalogs, theoretical tables of lasting values, etc.

The CDS requires the data tables to be in ascii format. Each table is accompanied by a readme.txt file that describes the table's content. The readme file format defines a standard that is used by all major astronomy journals. Again by contract with the Journal, the CDS provides help to A&A authors in order to prepare the files. Primary data can also be archived at the CDS as graphics files in FITS format. This is of particular interest for spectrograms.

Tables made available in electronic form at the CDS should be prepared according to the conventions explained below and they should be sent to the CDS upon acceptance of the paper, preferably using the `submission form` proposed on the CDS web site. Alternatively, the tabular material can be sent by e-mail to `cats@cdsarc.u-strasbg.fr`, or by ftp to `cdsarc.u-strasbg.fr`.

The electronic versions of the tables are systematically checked for consistency at the CDS, and the author may have to communicate with the CDS about missing descriptions or detected inconsistencies.

Preparation of the electronic tables

Tables to be published in electronic form at the CDS should preferably be prepared as plain ASCII files, one file per table; the description of all table layouts and contents should be gathered into a file named ReadMe, a template of which can be copied from ftp://cdsarc.u-strasbg.fr/pub/J/A+A/ReadMe.txt. In addition to the description of the tabular material, the role of the ReadMe file is to supply minimal details about the context and the history of the data. Detailed instructions for the preparation and the submission of the tabular data can be found at
`http://cdsweb.u-strasbg.fr/submit/`; specific questions can be addressed to
`cats@simbad.u-strasbg.fr`.

Reference to the material published electronically should appear in the printed text, including a description of the column headings of tabular material. The following text is an example of such a description:

> ”Table 1, available at the CDS, contains the following information. Column 1 lists the name of the source, Column 2 gives the bolometric luminosity...”.

Alternatively, an excerpt from the table (a few lines) can be provided in the printed version.

Retrieving electronic tables

For all papers, including old papers that do not have an electronic version, the online tables can be obtained from the CDS:

- by ftp:

```
ftp cdsarc.u-strasbg.fr (or 130.79.128.5) username: anonymous
password: (type your electronic address) cd pub/A+A/<volume>/<page>
mget * (to get all files)
```

- by web access from:

```
http://cdsweb.u-strasbg.fr/A+A.htx
http://cdsweb.u-strasbg.fr/A+AS.htx
```

3.8.2 Publishing data at the publisher

In principle, all information that is not crucial for understanding the paper can be published only in the electronic edition of the Journal, following the Editor-in-Chief's decision. For instance, such online material can be: observation logs, tables of properties that are also reproduced in figures, long mathematical derivations, redundant figures when only one example is needed to understand the discussion, etc. Movies can also be published in the electronic edition.

Access to the online material is only granted to subscribers. At the request of the Editor-in-Chief, they may be published both electronically and as hard copy. The material is displayed as HTML pages, if necessary including links to files under other formats, i.e. MPEG. Whenever the format of the online material allows it (text appendix, tables, etc.), it can be included in the .pdf version of the article as a separate section at the end. This section has special page numbering independent of that in the paper copy.

Detailed examples of how to prepare material for the electronic edition are available in Appendix A.3

3.9 Astronomical objects: linking to databases

SIMBAD, the astronomical database, and ALADIN, the interactive deep sky mapping facility at the CDS Strasbourg, create anchors for astronomical objects cited in A&A. Object names that are tagged with the `\object` macro and verified will appear linked to the object information in the electronic edition. As the one better placed to start the process and in order to help in the indexing, you should surround any astronomical object in your text, as well as in small tables with the command:

```
\object{<objectname>}
```

This command simply prints out its argument and adds the thus-marked element to the list of hyper-linked astronomical objects, so it should be repeated for each object.

In the `referee` version of your article or in the final (two-column) version, the list of your objects will automatically appear at the end (after the references). LaTeX will write an auxiliary file with the extension `obj` to prepare that list. Please, verify this list carefully.

Astronomical designations (also called Object Identifiers) are often confusing. We encourage you to test the stellar objects (in the `*.tex` file or in the `*.obj` file), using the sites and easy tools available at the CDS.

TeX files: `http://vizier.u-strasbg.fr/viz-bin/Object`
Obj files: `http://vizier.u-strasbg.fr/viz-bin/Sesame`

The Object Identifiers have been also collected and published by Lortet and collaborators in Dictionaries of Nomenclature of Celestial Objects outside the solar system (1994A&AS..107..193L). The information service available at http://vizier.u-strasbg.fr/cgi-bin/Dic is the electronic look-up version of the Dictionary, which is updated on a regular basis; it provides full references and usages about for 13211 different acronyms.

4 How to submit a manuscript

Any submission of Letters, regular articles, or Research Notes should be made via the site `http://www.aanda.org` and `Submission process`. Errata should be sent as a PDF file by e-mail to the A&A Editorial Office (`aanda.paris@obspm.fr`).

The Editor-in-Chief is:

Claude BERTOUT
A&A Editorial Office
Observatoire de Paris
61 avenue de l'Observatoire
75014 Paris - France
Tel. (33) (0)1 43 29 05 41
Fax (33) (0)1 43 29 05 57
e-mail: `aanda.paris@obspm.fr`
ftp: `aanda.obspm.fr`

The Letters Editor-in-Chief is:

Malcolm WALMSLEY
Osservatorio Astrofisico di Arcetri
Largo E. Fermi 5
I-50125 Firenze - Italy
Tel. +39 055 2752253
Fax +39 055 220039
e-mail: `aanda@arcetri.astro.it`

The submission process consists of two steps:

1. Register your new submission on the A&A Manuscript Management System (MMS) at `http://www.aanda.org` (choose `Submission process`).
2. Upload your manuscript directly to the MMS or to the A&A FTP site.

1. Registering your manuscript on the MMS

In order to register your new submission, you need to enter your author identifier. This is a unique and confidential number that is attributed to you upon your first submission to A&A. If you have submitted a paper to A&A before, you already have an author identifier. If you publish regularly with us, it is a good idea to note your author number for future reference.

If you are a new A&A author, you will be asked to fill out a registration form and an identifier will be attributed to you.

If you have forgotten your author identifier, go to `Submission process`. Click on `New submission` (on the left side of the page) and follow the link for retrieving your number. You will be asked to enter your e-mail address and your identifier will be mailed to the given address if MMS finds a correspondence between the e-mail address you entered and an A&A author.

If you have recently changed your e-mail address, do NOT fill out a new registration form, but instead contact the Editorial Office at `aanda.paris@obspm.fr` and your author identifier will be communicated to you.

2. Uploading your manuscript file

You will first need to prepare your manuscript as a single PDF (preferred) or PostScript file.

- Your manuscript file size is less than or equal to 3 Mbytes. Upload your file directly to the MMS.
- Your manuscript file size is larger than 3 Mbytes. You must upload your file to our FTP site at `ftp aanda.obspm.fr`

A typical sequence of commands for sending your file is as follows:

```
ftp aanda.obspm.fr
login: anonymous
password: your e-mail address
cd aanda
mkdir your name
cd your name
bin
put your\_file.pdf
bye
```

This is a typical sequence of commands for sending your file.
When loading a PDF file, always use the BINARY option otherwise we will not be able to read your file.

Note that the aanda folder is not read-enabled for obvious security reasons; therefore, you will not be able to check that your file has been transferred.

There have been rare reports of access problems to the server that are apparently attributed to some combinations of FTP clients and operating systems. In case of a problem, you might want to try using a different computer or FTP client to load your paper before contacting us.

5 The acceptance stage

5.1 Acceptance proposal from the Associate Editor and official acceptance by the Chief Editor

The Associate Editor in charge of a given paper proposes the paper's acceptance to the Editor-in-Chief, who then sends the author -sometimes with a delay of more than one week- the formal acceptance letter.

There are several reasons to this double acceptance process. First, the Editor-in-Chief needs to the make sure that the peer-review process is consistent, i.e., that the Associate Editors all have comparable acceptance criteria. The second reason is that formal acceptance requires several decisions from the Editor-in-Chief. The section of publication and keywords must be chosen and/or corrected; likewise, one must decide what level of language editing is needed, whether part of the article should be published in electronic form only, and whether the paper is subject to page charges.

Note that the official date of acceptance of the paper is the day when the paper is accepted by the Associate Editor in charge of the scientific peer-review process. Time spent after this decision to improve the manuscript and to make the final publishing decisions is editing time for which the author should not be penalized since the scientific content of the paper has already been deemed publishable.

The editorial decisions at acceptance time are the following. The first two, choice of section of publication and of keywords, should be self-explanatory. Since the author can enter these data in MMS using pull-down menus at the time the submission is sent to the Journal, the Editors should not even have to deal with them. In practice, however, many authors still do not indicate the Journal's section for which the paper is submitted, and the keywords must still be modified in many cases. Contributors are therefore encouraged to pay attention to these important details to save time between acceptance and publication.

5.2 Language editing

Papers are sent to language editors after acceptance, at the recommendation of either the referee or one of the Journal's editors. It is also important to know that, unlike at some journals, not all papers are looked at by a language editor, which can explain some differences in usage between the articles actually published, as well as some minor differences between suggestions made by each of the language editors.

Additional information are available in the A&A English guide or on the A&A web site.

6 The production stage

6.1 Sending your files to the publisher

After the paper has been accepted and **upon request from the Editor-in-Chief**, you will send the paper's files to the publisher.

- First prepare the final manuscript *.tex file by removing the referee option.
- Then prepare the figures files as *.ps or *.eps files and any additional style files needed. Name the LaTeX and PostScript files using the last 4 digits of your manuscript number (e.g. for Figure 1: 0030fig1.eps) so as to avoid any confusion.

You can then send the files:

1. by e-mail directly to the publisher at the following address:

   `aa.accepted@edpsciences.org`

2. by anonymous ftp to:

   ftp server: `ftp.edpsciences.org`
   username: anonymous
   password: your e-mail address
   directory: incoming/aa

   Please do not forget to inform the publisher by e-mail at `aa.accepted@edpsciences.org`.

   Generate a directory using the name of the first author or your manuscript number to hold all the files or generate a single archive (tar.gz). Please use lower-case for all directories and archives.

Tables made available in electronic form at the CDS should be prepared according to the conventions indicated above and detailed at `http://cdsweb.u-strasbg.fr/submit/`; they should be sent to the CDS upon acceptance of the paper, preferably using the `submission form` proposed on the CDS web site.

Alternatively the tabular material can be sent by e-mail to `cats@cdsarc.u-strasbg.fr`, or by ftp to `cdsarc.u-strasbg.fr`.

The electronic versions of the tables are systematically checked for their consistency at the CDS, and the author may have to communicate with the CDS about missing descriptions or detected inconsistencies.

6.2 PDF files of forthcoming papers

A&A now gives online access to unedited preprint versions of accepted papers several weeks ahead of publication, with the authors' consent. This service is free of charge for authors.

The authors' permission is requested either by MMS at the time of submission. The PDF file is produced by the publisher from the LaTeX file sent by the author and is released if the final size is less than 3 Mbytes without any conversion problems. This online version does not take into account corrections made during copy-editing and production processes.

Online access to PDF versions of forthcoming papers is granted to all A&A subscribers.

6.3 Page proofs

For all papers, except Letters, page proofs will be sent to the authors by e-mail (PDF file). Please note that corrections should be restricted to typographical errors; fees for extensive additional changes will be charged to the author. Where absolutely essential, the addition of a "Note added in proof" will be considered and, if accepted, will appear at the end of the paper, following the reference list.

6.4 Offprints

For each article, 25 offprints are supplied free of charge, regardless of the number of authors.

To highlight your work, the supplementary offprints now possess a cover in colour, similar to that of the journal, resuming the title and name of the authors of the article.

Please note that if you do not order additional reprints, then the 25 reprints free of charge will be provided without cover. However, it is possible to obtain these 25 offprints with a cover for an additional fee (170 Euros). If you order additional copies, all the offprints will include a cover. Only multiples of 50 are accepted.

An example of an offprint with a cover is available on the web site, `Author information`

Offprints are available at the prices listed in the table, **provided the order is received at the same time as the corrected proofs**. The offprint order form must be filled out and returned with the corrected proofs.

Additional offprints (prices in Euros, subject to change without notice – VAT: 5.5%).

Copies / **Pages**	**1–4**	**5–8**	**9–12**	**13–16**	**17–20**	**21–24**	**25–28**	**29–32**
50	212	273	330	404	441	480	519	561
100	239	315	384	465	507	554	596	645
200	354	485	596	714	788	867	933	1010
300	468	653	806	963	1067	1182	1271	1374
400	584	822	1017	1212	1347	1496	1608	1737
500	699	990	1227	1461	1559	1811	1946	2102

A How to prepare your TEX file: examples

A.1 Example of a manuscript header

```
\documentclass{aa}
\usepackage{txfonts}

\begin{document}

\title{Optimality relationships for $p$-cyclic SOR
  \thanks{Research supported in part by the US Air Force
    under grant no. AFOSR-88-0285 and
    the National Science Foundation under grant
    no. DMS-85-21154}\fnmsep
  \thanks{This is a second footnote}\\
  resulting in asymptotically faster convergence\\
  for the same amount of work per iteration}

\subtitle{II. An example text with infinitesimal
  scientific value\\
  whose title and subtitle may also be split}

\author{Daniel J. Pierce\inst{1}
  \and Apostolos Hadjidimios\inst{2}
  \thanks{\emph{Present address:}
    Department of Computer Science, Purdue University,
    West Lafayette, IN 47907, USA}
    \and Robert J. Plemmons\inst{3}}

\offprints{R. Plemmons, \email{plemmons@...}}

\institute{Boeing Computer Service, P.O. Box 24346,
  MS 7L-21, Seattle, WA 98124-0346, USA
  \and Department of Mathematics, University of Ioannina,
  GR-45 1210, Ioannina, Greece
  \and Department of Computer Science and Mathematics,
  North Carolina State University, Raleigh, NC 27695-8205, USA}

\date{Received 2 November 1992 / Accepted 7 January 1993}

\abstract {} {We look for characteristics typical of water-megamaser galaxies
in SO 103-G035, TXS 2226-184, and IC 1481.} {We obtained long-slit optical
emission-line spectra.} {We present rotation curves, line ratios, electron
densities, temperatures. IC 1481 reveals a spectrum suggestive of a vigorous
starburst in the central kiloparsec 108 years ago.} {We do not find any hints
for outflows nor special features which could give clues to the unknown
megamaser excitation mechanism.}

\keywords{interstellar medium: jets and outflows --
 interstellar medium: molecules -- stars: pre-main-sequence}}
\maketitle
```

A.2 Examples of tables and figures

A.2.1 Figures

Include the package in the preamble of your document as follows:

```
\usepackage{graphicx}
```

To fill the whole column width, the figure has to be resized with the `resizebox` command.

```
\begin{figure}
  \resizebox{\hsize}{!}{\includegraphics{<yourfilename.eps>}}
  \caption{<Your caption text...>.}
  \label{<Your label>}
\end{figure}
```

For a two-column-wide plot, substitute `figure` by `figure*`.

```
\begin{figure*}
\centering
  \includegraphics[width=17cm]{<yourfilename.eps>}
    \caption{<Your caption text...>.}
    \label{<Your label>}
\end{figure*}
```

A&A also uses a third width, 12 cm; that is, with the figure caption at its lower right-hand side. To achieve this format, use

```
\begin{figure*}
\sidecaption
  \includegraphics[width=12cm]{<yourfilename.eps>}
    \caption{<Your caption text...>.}
    \label{<Your label>}
\end{figure*}
```

A.2.2 Simple tables

Simple tables must be prepared as in the example below.

Table 1: Nonlinear Model Results

HJD	E	Method#2	Method#3
1	50	−837	970
2	47	877	230
3	31	25	415
4	35	144	2356
5	45	300	556

The corresponding TEX code is as follows

```
\begin{table}
\caption{Nonlinear Model Results}             % title of Table
\label{table:1}      % is used to refer this table in the text
\centering                          % used for centering table
\begin{tabular}{c c c c}        % centered columns (4 columns)
\hline\hline                 % inserts double horizontal lines
HJD & $E$ & Method\#2 & Method\#3 \\    % table heading
\hline                        % inserts single horizontal line
```

```
   1 & 50 & $-837$ & 970 \\      % inserting body of the table
   2 & 47 & 877    & 230 \\
   3 & 31 & 25     & 415 \\
   4 & 35 & 144    & 2356 \\
   5 & 45 & 300    & 556 \\
\hline                                    %inserts single line
\end{tabular}
\end{table}
```

To produce two columns width tables, use the `table*` environment.

If a horizontal line is required in the table, the `\cline{n-m}` command is used to draw a horizontal line from the left side of the column *n* to the right side of the column *m*.

The `\multicolumn{num}{col}{text}` command is used to combine the following `num` columns into a single column with their total width:

```
\hline\hline                 % inserts double horizontal lines
HJD & \multicolumn{3}{c}{Methods}\\
\hline                        % inserts single horizontal line
```

The output is:

HJD	Methods		
1	50	−837	970
2	47	877	230
3	31	25	415
4	35	144	2356
5	45	300	556

Some examples of a table with footnotes or a rotated table in landscape are given in the `aa.dem` file.

A.2.3 Tables larger than a page

Tables larger than a page should be composed at the end of the document. In the text, at the place where the large table should appear, add the command: `\addtocounter{table}{1}` and Tables counters will be well numbered.

Authors may use one of the two dedicated packages `supertabular` and `longtable`. Put the package in the preamble of your document as follows:

`\usepackage{longtable}` or `\usepackage{supertabular}`

and write your long table at the end.

- `supertabular`

  ```
  \end{thebibliography}
  % end of the main text
  \clearpage
  \onecolumn
  % if table 2
  \setcounter{table}{2}
  \begin{supertabular}
  ...
  \end{supertabular}
  ```

- `longtable`
  `aa.cls` has adapted a command `\longtab{}{}` to this package.

```
\end{thebibliography}
% if table 2
\longtab{2}{
\begin{longtable}{lllrrr}
\caption{\label{kstars} Sample stars with absolute magnitude}\\
\hline\hline
Catalogue& $M_{V}$ & Spectral & Distance & Mode & Count Rate \\
\hline
\endfirsthead
\caption{continued.}\\
\hline\hline
Catalogue& $M_{V}$ & Spectral & Distance & Mode & Count Rate \\
\hline
\endhead
\hline
\endfoot
Gl 33    & 6.37 & K2 V & 7.46 & S & 0.043170\\
Gl 66AB  & 6.26 & K2 V & 8.15 & S & 0.260478\\
Gl 68    & 5.87 & K1 V & 7.47 & P & 0.026610\\
         &      &      &      & H & 0.008686\\
Gl 86
\footnote{Source not included in the HRI catalog. See Sect.~5.4.2 for details.}
         & 5.92 & K0 V & 10.91& S & 0.058230\\
\end{longtable}
}% End \longtab
```

A.3 Material for the electronic edition: examples

- **Text appendices**
  Online appendices have to be placed at the end after `\end{thebibliography}`. Add the `Online` command and write your text (this section will be published as received, without any changes by the publisher).

```
\end{thebibliography}

\Online

\begin{appendix} %First online appendix
\section{Background galaxy number counts}
...
\begin{figure*}
\centering
\includegraphics[width=16.4cm,clip]{1787f24.ps}
\caption{Plotted above...}\label{appfig}
\end{figure*}
...
\end{appendix}

\begin{appendix} %Second online appendix
...
\end{appendix}
\end{document}
```

- **Some tables or figures are in the printed version and some are only in the electronic version.** Leave all the tables or figures in the text, at their right place, and use the commands `\onlfig{}{}` and `\onltab{}{}`. These elements will be automatically placed at the end in the section Online material.

```
\documentclass{aa}
...
\begin{document}
...
\begin{figure*}%f1
\includegraphics[width=10.9cm]{1787f01.eps}
\caption{Shown in greyscale is a...}\label{301}}
\end{figure*}
...

% Figure 2 and 3 available electronically only
\onlfig{2}{
\begin{figure*}%f2
\includegraphics[width=11.6cm]{1787f02.eps}
\caption {Shown in greyscale...} \label{018}
\end{figure*}
}% end of onlfig
... \onlfig{3}{
\begin{figure*}%f3
\includegraphics[width=11.2cm]{1787f03.eps}
\caption{Shown in panels...} \label{059}
\end{figure*}
}% end of onlfig
...
\begin{table}%t1
\caption{Complexes characterisation.}\label{starbursts}
\begin{tabular}{lccc}
...
\end{tabular}
\end{table}
...
% Figure 4 available electronically only
\onlfig{4}{
\begin{figure*}%f4
\includegraphics[width=11.2cm]{1787f04.eps}
\caption{Shown in panels...} \label{38}}
\end{figure*}
}% end of onlfig
...
% Table 2 available electronically only
\onltab{2}{
\begin{table*}%t2
\caption{List of the LMC stellar complexes...}\label{Properties}
\begin{tabular}{lccccccccc}
...
\end{tabular}
\end{table*}
}% end of onltab
```

Some other examples of large, online tables are also given in the `aa.dem` file.

B General typing rules

B.1 Fine tuning of the text

The following should be used to improve the readability of the text:

`\,` a thin space, e.g. between thousands in numbers with more than 4 digits; a line division will not be made following this space,
`--` en-dash; two hyphens, without a space at either end,
`␣--␣` Please note: in TEX, `---` gives an em-dash "—"; we do not use this, but rather the shorter en-dash *with* spaces, i.e. space, two hyphens, for an en-dash, space, to give an "em-dash".
`-` hyphen; no space at either end,
`$-$` minus, in the text *only*,
`~` fixed space, e.g. between parts of names.

Their use is best explained in the following example.

Sample input:

```
20\,000 km, 1\,000\,000 s, HD 174\,638 1950--1985, p.~11--21 this -- written on
a computer -- is now printed signal-to-noise ratio, early-type, metal-poor,
non-relativistic $-30$~K, $-5\ ^{\circ}$C Dr.~h.c.~Rockefeller-Smith and
Prof.~Dr.~Mallory
```

Sample output:

20 000 km, 1 000 000 s, NGC 468 324 1950–1985, p. 11–21 this – written on a computer – is now printed signal-to-noise ratio, early-type, metal-poor, non-relativistic −30 K, −5 °C Dr. h.c. Rockefeller-Smith and Prof. Dr. Mallory

B.2 Units, symbols, and nomenclature

Authors can considerably help the publisher by observing the following rules:

a) The text should make clear distinctions between physical variables, mathematical symbols, units of measurement, abbreviations, chemical formulae, etc.

b) Italics and boldface should be used appropriately to identify physical or mathematical variables. In general, variables are set in regular italics, vectors in boldface italics. Physical constants such as the speed of light, the Boltzmann constant, the Hubble constant and the solar mass are also set in regular italics.

c) Italics should never be used for units of measurement e.g. km, erg cm^{-2}, s^{-1} or for chemical formulae unless, of course, these items fall within a passage that is entirely in italics.

d) As far as possible, italics should be avoided for the following: mathematical signs such as "d" (total differential), "e" (base of natural logarithm), "i" (imaginary unit), "pi" (3.14159...), and abbreviations used as subscripts or superscripts to variables, but serving merely as labels, e.g. Q_{d} (d = dust), m_{e} (e = electron). However, in conformity with the rest of the text, italics should be used if the subscripts or superscripts are variables themselves.

e) For common units of measurement (SI and non-SI), standard abbreviations should be used. Unusual units may, at the authors' discretion, be written in full, at least at the first mention. Some traditional, non-SI units persist in astronomy literature. Some are acceptable (e.g. erg, angström/Å) but others are obsolescent and should be avoided (e.g. micron/μ). Compound units in which the meaning "per" is implied can be written using either a slash or a negative index: A&A prefers the latter style, e.g. km s^{-1} instead of km/s.

f) For the correct naming of astronomical objects outside the solar system, it is suggested that authors refer to the recommendations on nomenclature given by the International Astronomical Union at
`http://cdsweb.u-strasbg.fr/Dic/how.htx`

B.3 Special typefaces

Emphasize: (`\emph{Emphasize}`) should be used for emphasis in the text.

Vectors: `\vec{Symbol}`, vectors may only appear in math mode.
Examples:
Input: `$\vec{A} \times \vec{B} \cdot \vec{C}$`
Output: $\boldsymbol{A} \times \boldsymbol{B} \cdot \boldsymbol{C}$
Input: `$\vec{A\/}^{\rm T} \otimes \vec{B} \otimes \vec{\hat D}$`
Output: $\boldsymbol{A}^{\mathrm{T}} \otimes \boldsymbol{B} \otimes \hat{\boldsymbol{D}}$

Tensors `\tens{Symbol}`], tensors may only appear in math mode.
Example:
Input: `\tens{ABC}`
Output: ABC

Ions `\ion{<element symbol>}{<degree of ionization>}`, the degree of ionization in the `\ion` command has to be given as lower case roman numerals (e.g. `\ion{H}{ii}` which yields H II).
Examples:
Input: `\ion{H}{II}`
Output: H II
Input: `\element[][13]{C}`
Output: ^{13}C

Elements `\element[<electrical charge>][<number of nucleons>] [<number of protons>] [<number of neutrons>]{<element symbol>}`
Note, that if you want to have for example ^{13}C, the last two optional arguments may be omitted: `\element[][13]{C}`.

B.4 Signs and characters

You may need to use special signs. The available ones are listed in different books (*LaTeX User's Guide & Reference Manual, The LaTeX Companion, etc.*). We have created further common astronomy symbols:

In	Explanation	Out	In	Explanation	Out
`\sun`	sun symbol	$\odot$	`\fs`	fraction of second	$\overset{\mathrm{s}}{.}$
`\degr`	degree	$^\circ$	`\fdg`	fraction of degree	$\overset{\circ}{.}$
`\diameter`	diameter	$\varnothing$	`\fp`	fraction of period	$\overset{\mathrm{p}}{.}$
`\farcs`	fraction of arcsecond	$\overset{\prime\prime}{.}$			
`\fd`	fraction of day	$\overset{\mathrm{d}}{.}$	`\farcm`	fraction of arcmin	$\overset{\prime}{.}$
`\arcsec`	arcsecond	$''$	`\fh`	fraction of hour	$\overset{\mathrm{h}}{.}$
`\arcmin`	arcminute	$'$	`\fm`	fraction of minute	$\overset{\mathrm{m}}{.}$

In	Out	In	Out
`\la`	$\lesssim$	`\ga`	$\gtrsim$
`\cor`	$\widehat{=}$	`\sol`	$\stackrel{\sim}{<}$
`\sog`	$\stackrel{\sim}{>}$	`\lse`	$\stackrel{<}{\simeq}$
`\gse`	$\stackrel{>}{\simeq}$	`\grole`	$\gtreqless$
`\leogr`	$\lesseqgtr$	`\loa`	$\lessapprox$
`\goa`	$\gtrapprox$	`\getsto`	$\leftrightarrows$
`\lid`	$\leqq$	`\gid`	$\geqq$

B.5 Mathematical formulae

All equations that you are referring to with `\ref` must have the corresponding `\label` – please use this mechanism only. Punctuate a displayed equation in the same way as ordinary text.

```
\left(   \left[
\right)  \right]
```

Note that the sizes of the parentheses or other delimiter symbols used in equations should ideally match the height of the formulas being enclosed. This is automatically taken care of by these LaTeX commands.

Italic and roman type in the math mode

In math mode LaTeX treats all letters as though they were mathematical or physical variables; hence they are typeset in italics. However, any textual elements within formulas should be set in roman. Roman should also be used for subscripts and superscripts *in formulas* where these are merely labels and not in themselves variables, e.g.

`$T_\mathrm{eff} =` `5\times 10^{9}\ \mathrm{K}$`	produces	$T_\mathrm{eff} = 5\times 10^{9}\ \mathrm{K}$
`$T_\mathrm{K}$`	produces	T_K (K = Kelvin)
`$m_\mathrm{e}$`	produces	m_e (e = electron)

However, do not use roman if the subscripts or superscripts represent variables, e.g. $\sum_{i=1}^{n} a_i$.

Please ensure that *physical units* (e.g. pc, erg $\mathrm{s^{-1}\ K}$, $\mathrm{cm^{-3}}$, $\mathrm{W\ m^{-2}\ Hz^{-1}}$, $\mathrm{m\ kg\ s^{-2}\ A^{-2}}$) and *abbreviations* such as Ord, Var, GL, SL, sgn, const. are always set in roman type with an appropriate inter-word spacing. To ensure this, use the `\mbox` command: `\mbox{Hz}`. On p. 44 of the *LaTeX User's Guide & Reference Manual* (2nd ed.) by Leslie Lamport, you will find the names of common mathematical functions, such as log, sin, exp, max, and sup. These should be coded as `\log`, `\sin`, `\exp`, `\max`, `\sup` and will then automatically appear in roman.

In order to distinguish "d" used as the "differential sign" and "e" used as the "exponential function" from normal variables, set these letters in roman.

Chemical symbols and formulas should be set in roman, e.g. Fe not Fe, $\mathrm{H_2O}$ not H_2O, $\mathrm{H}\alpha$ not $H\alpha$.