Astronomy & Astrophysics

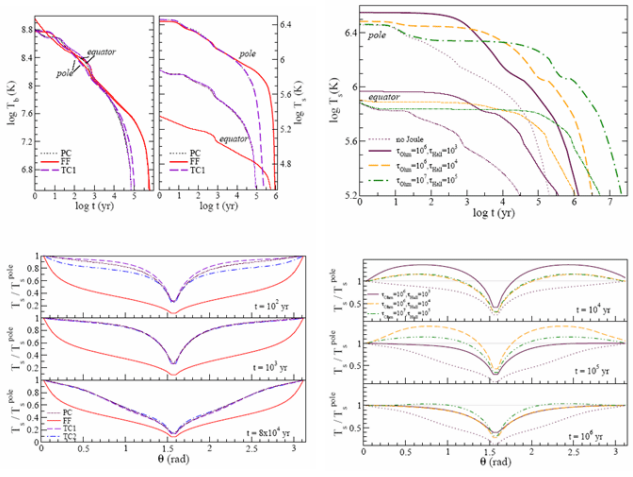
HIGHLIGHTS: this week in A&A

Volume 486-1 (July IV 2008)

In section 3. Cosmology (including clusters of galaxies)

"A twelve-image gravitational lens system in the z = 0.84 cluster Cl J0152.7-1357", by C. Grillo, M. Lombardi, P. Rosati, G. Bertin, R. Gobat, R. Demarco, C. Lidman, V. Motta, and M. Nonino, A&A 486, p. 45

According to Einstein's Theory of General Relativity, light rays traveling from distant cosmic sources "sense" the presence of matter located close to their path to the observer. Light is deflected by the gravitational field of the massive objects (which could be galaxies, galaxy clusters, or even dark objects escaping all other types of detection), in some cases creating multiple images of a given light source. This process, called gravitational lensing, has several analogies with classical optics in the way it predicts the bending of light rays. In the past decade, the use of this physical process has become a standard technique for determining the cosmic mass distribution and its evolution with time. The present paper presents evidence of a spectacular limiting case of a triple distant source at redshift z>1.9. Each of the three images is split into four sub-images by a foreground galaxy located in a cluster at redshift z=0.84, thereby allowing a detailed investigation of the distribution of the dark matter associated with the lens system.



In section 7. Stellar structure and evolution

"2D cooling of magnetized neutron stars", by D. Aguilera, J. Pons, and J. Miralles, A&A 486, p. 255

The authors present two-dimensional simulations of the thermal evolution of magnetic neutron stars. The models include realistic equations of state including superfluidity, two-dimensional thermal conductivities, Joule dissipation by the magnetic field, and a variety of neutrino cooling mechanisms. The cooling curves are calculated in time with light curves produced, pole to equator temperature differences reach about a factor of two and remain so for most of the cooling history for reasonable neutron star magnetic field strengths.