

SMALL MOLECULAR CLOUDS TOWARD THE GALACTIC CENTRE

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Wide-field near-infrared images of a region near the centre of the Galaxy reveal a wealth of stars superimposed on wide-scale diffuse emission. Projected against this emission are many irregularly shaped patches of obscuration which I identify as small molecular clouds. The smallest of these, if near the Galactic Centre itself, are less than 1 pc in diameter. The overall appearance is very similar to that of the Milky Way as seen on a moonless night. Some quantitative results on the diffuse emission and on the molecular clouds are presented.

ON THE ORIGIN OF THE RADIAL ORBIT INSTABILITY

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Spherical systems made up of stars moving on very elongated loop orbits suffer the radial orbit instability that turns them into elongated, bar-like, systems. We show here that loop orbits tend to erase, rather than to reinforce, any incipient bar-like perturbation to a central field, so that the origin of the instability lies in their transformation into box orbits, that bound the motion of the stars to the neighborhood of the bar, and to the containment ever closer to the bar of the box orbits as the bar perturbation increases. For very small angular momenta the transformation of loop into box orbits takes place even for bar perturbation less than 0.00004 of the central field. This result is interesting because it has been suggested that this mechanism is only possible for large values of the perturbation. Stochastic orbits are shown to appear even for small values of the perturbation (less than 0.06 of the central field), and they also contribute to the bar reinforcement.

THE STELLAR CONTENT OF THE OB ASSOCIATION LH 47 IN THE LMC

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The OB association LH 47 in the LMC is embedded in the giant ringlike H II region N44. A bright extended X-ray source is also related with this OB/H II complex. A SNR origin suggested for the extended X-rays appears at variance with the thermal nature of the radiosources contained in N44 (Milne et al. 1980, MNRAS, 191, 469). A comparison of the optical H α photograph with the X-ray contours (Wang & Helfand 1991, ApJ, 373, 497), and with the radiocontinuum maps of the region shows that the highest X-ray contour happens in the gas poor region inside the giant ring, while the radiosources coincide with the bright gas rich H II regions in the western border of the ring.

In order to evaluate properly a possible stellar wind contribution to the X-rays, we have studied the stellar content of LH 47, obtaining CCD images and spectral types of the member stars. Our observations disclose a pattern of sequential star formation in the sense that the brightest stars located inside the giant ring are early B supergiants, presumably older than the stars embedded in the bright H II regions, which we find to be early O-type. Matching our observed H-R diagram with numerical evolutionary tracks of massive stars indicates that the stars inside the giant ring are less massive than about 25 M_{\odot} , while the stars embedded in the bright H II regions bordering the ring range up to 60 M_{\odot} . Our results imply that the stellar winds contribute negligibly to the X-rays, which may originate from a SNR left by the explosion of a star more massive than 25 M_{\odot} , with non-existent or weak nonthermal radiocounterpart.

ENCOUNTERS WITH GIANT INTERSTELLAR CLOUDS AND MASS EXTINCTIONS

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Galactic orbits of the Sun and of several nearby giant molecular clouds (GMC's) and OB stellar associations were calculated backwards in time. It was found that the Sun passed near two of them, Ori OB1 and Mon OB1, around 15 My and 38 My ago in approximate coincidence with the date