LOOKING FOR STRUCTURES IN THE RING GALAXY HRG 54103

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The Ring Galaxy HRG 54103 (ESO 542-G03, MCG-03-04-042, IRAS 01162-1953), classified as saturn-like by Faúndez-Abans et al. (1992, A&A 94, 245), has had its morphological structure examined through image enhancement techniques in the spatial frequency domain of direct CCD images in the visible range.

This object also looks like Saturn on the film copies of the ESO/UPPSALA survey of the ESO(B) atlas, and has been classified as type LAR+ (RC3) and SA(r)0$^+$ by Buta (1995, ApJS 96, 39). This object has been observed by us at the LNA with the 1.6-m telescope and direct CCD camera in the B V R I Johnson-Cousins system (Bessell 1990, PASP102, 1181) and a 384 × 578 pixel chip with 0.″284/pixel. In this work, we employ image enhancement techniques in the B filter by the transform function on the spatial frequency domain, which is suitable to study fine structures, in particular, in galaxies. After the filtering processes, it is possible to identify several structures that may not be clearly appreciated at first sight or by means of simple convolution. In this example, we have performed both high-pass and low-pass filtering procedures, after which, external filaments outside the ring and two symmetrical H II regions in the ring, where new stars are probably forming stand out. Besides, turbulent internal

HRG 54103 then seems to be a polar ring galaxy because of the structure of the nucleus and the distribution of the material external to the ring. Evidences of two faint external ring-like structures have also been found, maybe a wave perturbation.

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OPTICAL VARIABILITY OF ACTIVE GALACTIC NUCLEI

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The Starburst Model (SBM) postulates that the variability observed in AGNs is produced by supernovae explosions and their compact remnants, resulting from the evolution of a young and massive stellar cluster at the center of galaxies (Terlevich et al. 1987; Aretxaga & Terlevich 1994). Then the variability can be treated as a Poissonian process, and the rms luminosity deviation of an AGN is proportional to the square root of its average luminosity.

We have developed a simple statistical model where we show that the expected luminosity distribution for luminous objects approaches a Gaussian and, in this case, the variance distribution corresponds to a χ^2-distribution. The relations of the model have been calibrated using observations of NGC 4151 (Aretxaga & Terlevich 1994).

This model was applied to the 46 AGNs of the Hamburg Quasar Monitoring Programm (Borgeest & Schramm 1994). We have tested the SBM by comparing the observed variability with that expected from the model. We suppose that there is a variability×wavelength relation of the type $\sigma_L \propto \lambda^{-\gamma}$, where γ is equal to 1 or 2.

Our results are better for $\gamma = 2$ than for $\gamma = 1$. Only 4 out of 46 objects present variability larger than that expected from the model. They are the brightest objects in the sample and are also radio-loud. A possible source of error might be the utilization of the Seyfert galaxy NGC 4151 to calibrate the model, because this galaxy is much fainter than the objects of the sample. On the other hand, we have verified that we favour the SBM by supposing that the lifetime of the supernova remnants is reduced for more luminous AGNs (Aretxaga et al. 1992).

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AN EVALUATION OF LOCAL SUPERBUBBLE EFFECTS ON THE COSMIC BACKGROUND RADIATION MAPS

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Temperature fluctuations ($\Delta T/T \approx 10^{-5}$) have been measured by the COBE team on the cosmic background radiation (CBR). We have recently shown that these temperature fluctuations indicate a fractal structure for the radiation and matter distributions at the recombination era (Gouveia Dal Pino et al. ApJ 442, L45, 1995). The solar system is immersed in a cavity left by supernova remnants (the so called local bubble). We have examined here the

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