



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Restarting activity in hard X-ray selected giant radio galaxies

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Giant radio galaxies (GRGs) are the largest (size >0.7 Mpc) and most energetic single objects in the Universe and represent an extreme class among radio-loud/jetted active galactic nuclei. Such large and old sources are ideal targets to study the duty cycle of the jet and nuclear activity. Here we discuss the X-ray and radio properties of a complete subsample of 15 GRGs; the sources were extracted from a parent sample of ~ 70 radio galaxies selected, for the first time, in the hard X-ray band from the INTEGRAL and Swift/BAT catalogues (Bassani et al. 2016). We find a correlation between the X-ray luminosity and the radio core luminosity consistent with the so-called fundamental plane of black hole activity, while the radio luminosity of the radio lobes is a factor of 10 weaker than expected from the nuclear luminosity (Ursini et al. 2018). We also find that, despite their old age, a large ($\sim 60\%$) fraction of objects host a young, gigahertz-peaked spectrum radio core (Bruni et al. 2019). Moreover, several objects show a peculiar radio morphology, such as double-double or X-shaped, indicative of a restarted activity. All in all, the X-ray and radio properties suggest an evolution driven by multiple activity phases of the central engine. Finally, we discuss the hard X-ray GRGs as multi-messenger sources of cosmic rays, gamma rays and neutrinos.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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