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Comparing radio-loud Swift/BAT AGN with their radio-quiet counterparts

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Some AGN are known to be efficient producers of strong, relativistic jets which power the extended radio sources. Most spectacular in respect of powers and sizes are the radio sources associated with AGN hosted by giant elliptical galaxies. However even among them, the production of powerful jets is a very rare phenomenon and the unanswered question remains why it is so. Since relativistic jets are most likely powered by rotating BHs via the Blandford-Znajek mechanism, one might expect that the parameters deciding about efficient jet production are BH spins and magnetic fluxes. If their values are large, then the innermost portions of accretion flow should be affected by the jet production and this should be imprinted in their radiative properties. In order to verify whether this is the case, we compare the radiative properties of radio-loud and radio-quiet AGN selected from the Swift/BAT catalog with similar BH masses and Eddington ratios. As we have found the only significant difference concerns the hard X-ray luminosities, which are about two times larger in radio-loud (RL) AGN than in radio quiet (RQ) AGN. One might speculate that this difference comes from having in RL AGN X-ray contribution not only from the innermost, hot portions of accretion flow, but also from a jet. However, this interpretation is challenged by our following findings: (1) hard X-ray spectra of RL AGN have similar slopes and high-energy breaks to those of RQ AGN; (2) hard X-ray radiation is to be in both RQ and RL AGN quasi-isotropic. Hence we argue that production of hard X-rays in the RL AGN is like in the RQ AGN, dominated by hot, central portions of accretion flows, while larger X-ray production efficiencies in RL AGN can be associated with larger magnetic fields and faster rotating BHs in these objects.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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