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Detection of an orthogonal alignment between parsec-scale AGN jets and their host galaxies

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Abstract

In this work we look at the connection between the direction of Active Galactic Nuclei (AGN) jets and the orientation of their host galaxies. Using both Very Long Baseline Interferometry (VLBI) and optical surveys, we can observe the innermost regions of the AGN jets in pc-scale as well as the kpc-scale host galaxy. We take careful consideration of the bias in the orientation of the jets and galaxies in the different optical surveys and find that the Dark Energy Spectroscopic Instrument Legacy Survey (DESI LS) is the least affected, being the only optical survey used for the final results. Among the 5853 optical counterparts of the radio jets found in DESI LS, we find a weak but significant (p-value $\lesssim 0.01$) alignment between the parsec-scale jet and the kpc-scale optical minor axis of the host galaxy for resolved sources with a measured spectroscopic redshift. This suggests that the observed source properties are connected over 3 orders of magnitude in scale.

My poster in zenodo.org can be found here