

Sub-haloes or systematics: Flux ratios anomalies of quadruply lensed radio AGN

Wednesday, 17 May 2023 13:15 (1 minute)

Anomalous flux ratios between lensed images can provide a key test of the dark matter sub-halo population, and hence the properties of dark matter particles. However, the observed anomalous flux ratios at radio frequencies can also be the result of systematics associated with our lack of knowledge about the source structure, source variability, and propagation effects within the lensing galaxy. Removing or ruling-out these systematic effects is crucial for confirming and improving existing constraints on dark matter. Here, I present some early results of high-resolution imaging with the High Sensitivity Array and monitoring with the Very Large Array at 15 GHz of a sample of 6 radio-loud lensed quasars. In some cases, the high resolution imaging shows evidence of extended source structure, which provides a more accurate determination of the image magnification's compared to when assuming a point source. From high cadence monitoring, we rule out any intrinsic source variability for the systems analysed thus far. However, we do find evidence for a frequency-dependent flux ratio in at least one case, likely from free-free absorption within the lensing galaxy, and scattering of the lensed images by the ionised medium in the lens.

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Session Classification: Poster Prizes & closing