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Wideband Radio Properties of the Radio Quiet AGN NGC 4388

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Recent observations by the Fundamental Reference AGN Monitoring Experiment (FRAMEx) [1] explored radio quiet Active Galactic Nuclei (AGN) by probing to sub-parsec scales with the Very Long Baseline Array (VLBA) to understand the source of radio emission from a volume-complete sample of 25 hard X-ray selected AGN. Using the Fundamental Plane of black hole activity [2] to determine expected 6 GHz radio luminosities from X-ray luminosity and the black hole mass, the VLBA surprisingly detected only 9 out of 25 sources in an initial snapshot campaign, in contrast to archival observations with the Very Large Array (VLA) where many of targets have previously been detected with 6 GHz observations. FRAMEx subsequently conducted 4-12 GHz wideband observations with the upgraded Jansky VLA for all 25 FRAMEx targets with full-Stokes polarization in order to examine their spectral, spatial and polarization features. I will be discussing the CASA [3] calibration and imaging procedures we are using for these wideband observations, as well as the limitations and pitfalls I have come across. I will also be presenting initial results from the target NGC 4388, one of the initial non-detections. The magnetic field lines measured for this edge-on galaxy are strongest along the radio knots and appear to show signatures of Faraday rotation with increasing radio frequency.

References

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[2] Merloni, A., Heinz, S., and di Matteo, T., "A Fundamental Plane of black hole activity", *Monthly Notices of the Royal Astronomical Society*, vol. 345, no. 4, pp. 1057–1076, 2003. doi:10.1046/j.1365-2966.2003.07017.x.

[3] CASA Team, "CASA, the Common Astronomy Software Applications for Radio Astronomy", *Publications of the Astronomical Society of the Pacific*, vol. 134, no. 1041, 2022. doi:10.1088/1538-3873/ac9642