Young Radio Sources across cosmic time: 20 years of Chandra study

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ABSTRACT:
Giga-Hertz Peaked Spectrum (GPS) and Compact Steep Spectrum (CSS) radio sources comprise a population of compact objects with radio emission fully contained within the innermost regions of the host galaxy (≤ a few kpc). Spectral and kinematic age measurements indicate their young age (typically < thousands years, and in some cases less a few hundred years). These sources provide the important insights to the initial phase of the jet formation, radio source growth, source evolution, and the jet impact on the ISM in the very central regions of the host galaxy. Over the last two decades we used Chandra to study the X-ray properties of these sources. Because these sources are relatively faint in X-rays only a few sources have been detected by other X-ray missions before Chandra. We have obtained Chandra and XMM-Newton observations for a large sample of these radio sources over several orbit cycles. Our most recent Chandra observations targeted Compact Symmetric Objects (CSO) associated with the nuclear regions of nearby galaxies, and a small sample of MHz-peaked sources constituting the first X-ray sample of young radio sources at high redshift.

Building X-ray Sample of Young Radio Sources

- 48 GPS/CSS radio sources at z > 1
- 13 Quasars and 35 Galaxies
- 17 CSO with known kinematic age from the expansion of the radio hot spots (<300 years old)
- 15 young radio source candidates at z > 4.5

Study:
- Radio Source Evolution
- Nature of the high energy emission
- Environment of compact radio sources

References

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