Multiwavelength Observations of the Quasar Jet in PKS 1030-357

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Prior PKS 1030-357 details

- $z = 1.455$
- Flat spectrum radio quasar with radio jet
- Unusual X-ray structure:
  - Either a double hot spot with strong X-rays from both
  - Or bright X-ray knots following a sharp bend
New PKS 1030-357 data

- New radio data: southern X-ray bright features have steep spectral indices ($\alpha \sim 1.2$, where $S_\nu \propto \nu^{-\alpha}$)
- No clear counterparts in infrared or optical
- Strong detection of X-ray jet; more structural details
New PKS 1030-357 data

- If synchrotron extends to X-rays, it will dominate non-beamed $B_{\text{me}}$ models of SSC or IC-CMB, but can’t provide X-ray flux.
- Inverse Compton could match $\alpha = 0.9 \pm 0.3$ X-ray spectrum, but requires extremely non-$B_{\text{me}}$ field or relativistic beaming.

Stay tuned - more to come!

Preprints and more available at http://space.mit.edu/~jonathan/jets/
Supplemental slides
Candidate optical/IR counterparts

- HST places optical/IR source near SE hot spot outside of the radio contours
- Faint optical source at the tip of the inner jet
Diffuse structure

- Significant diffuse X-ray emission around PKS 1030-357 system; good agreement with lobes seen at lower radio frequencies
- Likely IC emission from lobes