Contribution ID: **52** Type: **Talk**

Relativistic X-ray jets at high redshift

Monday 10 September 2018 10:50 (20 minutes)

Powerful radio sources and quasars emit relativistic jets of plasma and magnetic fields that travel hundreds of kilo-parsecs, ultimately depositing energy into the external medium. In the rest frame of the jet, the energy density of the cosmic microwave background is enhanced by the bulk Lorentz factor as Γ^2, and when this exceeds the magnetic energy density the primary loss mechanism of the relativistic electrons is via inverse Compton scattering. At large redshift, the microwave energy density is further enhanced by a factor $(1+z)^4$. We are surveying a z > 3 sub-sample of radio sources selected with flux density > 70 mJy, and with a spectroscopic redshift. We find cases of the X-rays extending beyond the detectable radio jet, and a case we interpret as an X-ray lobe where the radio emitting electrons have faded below detectable limits.

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