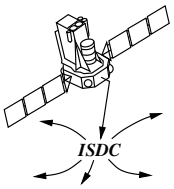

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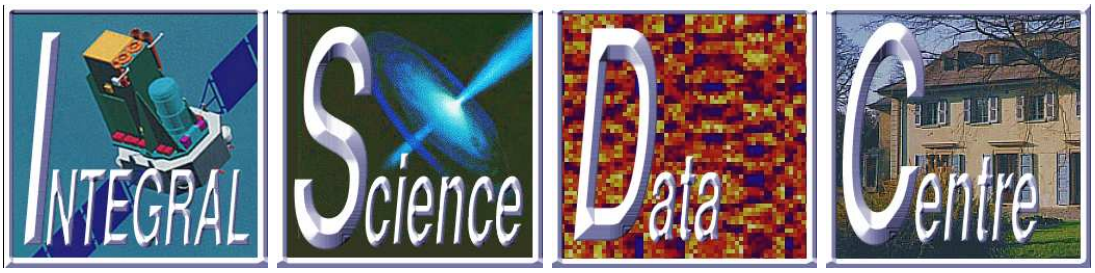
ASTROPHYSICS SEMINAR



Wednesday, 9 June 2004 at 10:30

Kinematics and dynamics of relativistic jets

Robert Laing
European Southern Observatory (Garching, Germany)

Abstract. The end-on relativistic jets that produce spectacular gamma-ray emission energies must have side-on counterparts. For nearby BL Lac objects, including the known TeV sources, these counterparts are low-luminosity (FR I) radio galaxies. Their jets are bright at radio wavelengths, and also often show optical and X-ray synchrotron emission. The jets must decelerate from relativistic (>0.9c) to sub-relativistic (<0.1c) speeds on kiloparsec scales. Modelling of deep, high-resolution VLA images of the jets in FR I radio galaxies on kiloparsec scales has allowed us to derive their three-dimensional distributions of velocity, emissivity and magnetic-field structure, all for the first time. We have demonstrated that deceleration, transverse velocity gradients and the dominance of the toroidal field component on large scales are general features of FR I jets. By combining our models of jet kinematics with measurements of the external pressure and density derived from Chandra observations, we can also derive the jet dynamics via a conservation-law approach. This gives us the variation of pressure, density, entrainment rate and Mach number along the jets, again for the first time. We can also quantify the amount and location of distributed particle acceleration independently from radio and X-ray observations.

NB: This seminar is followed at 11:15 by "The Atacama Large Millimetre Array (ALMA)"

Additional Information

The seminars are given in the ISDC "Pavillon" building
Address: INTEGRAL Science Data Centre, ch. d'Écogia 16, CH-1290 Versoix
WWW: ISDC Seminars: `http://isdc.unige.ch/index.cgi?Science+seminars`