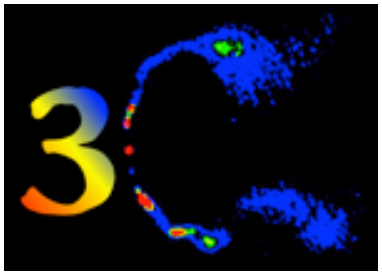

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Hot Relativistic Jets

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Comparable energy contents of radio lobes in FR II sources calculated using their luminosities and their confinement by external medium seem to exclude possibility of their energy domination by protons. This suggests that the jets powering the lobes are pair dominated. Large pair content of jets is indicated also by blazar models, which for the electron-proton plasma predict much larger jet powers than obtained using energetics of their radio lobes. However, noting the very efficient cooling of electrons/positrons in blazars, the energy flux of jets at sub-parsec distances from a black hole is expected to be dominated by protons and magnetic fields rather than by pairs. Neglecting the leptonic contribution to the jet energy flux also at kpc scales would imply very efficient conversion of kinetic energy of cold protons to internal energy of electrons and positrons in terminal shocks. This however is rather difficult to accomplish and, therefore, we propose that energetical domination of pairs over protons is already achieved prior to the jet termination. We investigate conditions required to form such hot, pair-dominated jets and provide some additional observational and theoretical arguments in favor of their existence.

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