THE 2ND PIETRO BARACCHI CONFERENCE

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Multi-frequency polarimetry of complete samples of extragalactic radio sources

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The high-frequency (> 20 GHz), bright flux density (> 200 mJy) radio population is dominated by blazars. Their polarization properties are invaluable to study magnetic fields and plasma in the inner and unresolved regions of relativistic jets. For Cosmology, these objects are important contaminant of CMB at scales smaller than 30' up to 100 GHz, hence they hamper the detection of primordial B-modes associated to inflation. However, their properties are still poorly constrained: results in literature are easily affected by spectral, detection and variability-related biases.
We present an unbiased analysis of high sensitivity (σ_P ~ 0.6 mJy/beam, ~90% detection rate at 5σ) multi-frequency (and multi-epoch) polarimetric observations for a complete sample of 104 compact extragalactic radio sources drawn from the faint (> 200 mJy at 20 GHz in total intensity) Planck-ATCA Co-eval Observations (PACO) catalogue, performed with ATCA at 7 frequencies, over the 1.1-39 GHz frequency range. An ALMA project extends the analysis up to 100 GHz for a (complete) sub-sample of 32 objects. We classify our sources in terms of stuctural complexity, finding different behaviours in polarization fractions (linear and circular) and position angles (PPAs). We produced differential source counts in polarization and assess forecasts for CMB studies.

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