

21 cm cosmology and the BINGO radio telescope

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Cosmology in the XXI century is experiencing a “Golden Age”, with observations and theoretical models contributing to a large-scale description of the Universe. The current view is that it can be well described by the so-called Lambda-CDM model, but some open problems challenge physics and cosmology, including the origin and properties of so-called dark energy. The so-called baryonic acoustic oscillations (BAO), detected for the first time in 2005, are considered one of the most effective probes to understand the properties of dark energy. However, given the implications of these measurements, it is important that they are confirmed at other wavelengths and measured over a wide range of redshifts. The radio band provides a unique and complementary observation window, by emitting 21 cm of neutral hydrogen. The redshifted 21 cm (1420 MHz) emission of the hyperfine transition of neutral hydrogen is measured at lower frequencies, so that the observation frequency is converted directly into information about the source’s redshift. The BINGO radio telescope (BAO from Integrated Neutral Gas Observations) is a new instrument, designed specifically to observe BAO, mapping a redshift band between 0.13 and 0.45. This seminar will present the basics of 21 cm BAO cosmology, the intensity mapping technique used and describe the current development status of the BINGO radio telescope.

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