

**Proponente:** Dott.ssa Ester Piedipalumbo (ester@na.infn.it)

**Titolo:** "High Redshift Investigation On The Dark Energy Equation of State"

**Descrizione:** The understanding of the accelerated expansion of the Universe poses one of the most fundamental questions in physics and cosmology today. Whether or not the acceleration is driven by some form of dark energy, and in the absence of a well-based theory to interpret the observations, many models have been proposed to solve this problem, both in the context of General Relativity and alternative theories of gravity. Actually, a further possibility to investigate the nature of dark energy lies in measuring the dark energy equation of state (EOS),  $w$ , and its time (or redshift) dependence at high accuracy. However, since  $w(z)$  is not directly accessible to measurement, reconstruction methods are needed to extract it reliably from observations. This project is focused on investigating different models of dark energy, described through several parametrizations of the EOS. The high-redshift analysis is based on Type Ia Supernovae (SNIa) data set, the Hubble diagram constructed from some Gamma Ray Bursts (GRBs) luminosity distance indicators, and Gaussian priors on the distance from the Baryon Acoustic Oscillations (BAO), and the Hubble constant  $h$ . To perform our statistical analysis and to explore the probability distributions of the EOS parameters the students will use a Bayesian approach and the Markov-Chain Monte-Carlo Method (MCMC).