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The Baryon Oscillation Spectroscopic Survey (BOSS): Dark Energy from the World's Largest Redshift Survey

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I will introduce the Baryon Oscillation Spectroscopic Survey (BOSS), the world's largest extragalactic redshift survey. The key goal of BOSS is the study of dark energy by the baryon acoustic oscillation (BAO) method, in which sound waves from the first 400,000 years after the Big Bang produce a distinct feature of calculable size in the late-time clustering of the Universe. As a part of the Sloan Digital Sky Survey III, BOSS uses spectra of 1.5 million galaxies and 160,000 high-redshift quasars to produce a detailed map of the large-scale structure of the Universe. BOSS has produced percent-level measurements of the cosmic distance scale over a range of redshifts using the BAO, sharply testing the standard cosmological model, as well as detailed probes of the large-scale gravitational dynamics of the Universe. I will describe the design and execution of the survey and the physical principles behind its major cosmological methods.