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Measuring baryon acoustic oscillations using the distribution of intergalactic gas

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The Baryon Oscillation Spectroscopic Survey (BOSS) of SDSS-III has ushered in a new era for high-redshift quasar surveys studying the large-scale structure of the Universe through intervening absorption by the intergalactic gas. The unprecedented number of quasar absorption spectra provided by BOSS allows us to measure the expansion rate and geometry of the Universe at redshift $z > 2$ using baryon acoustic oscillations (BAO) imprinted in large-scale structures. I will present the latest measurements of the BAO scale using the absorption auto-correlation and cross-correlation with quasars based on 160,000 quasar spectra taken from SDSS-III Data Release 12. By combining the BAO results from the auto- and cross-correlation, the Hubble parameter is measured with a precision of nearly 2%, providing direct evidence that the cosmic expansion was decelerating 11 billion years ago. New data from the ongoing Extended Baryon Oscillation Spectroscopic Survey (eBOSS) of SDSS-IV and the near-future surveys DESI and WEAVE will greatly enhance the precision of the BAO measurement over the next decade.

Experimental Collaboration

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