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2.1% measurement of the Baryon Acoustic Oscillation scale using the Dark Energy Survey final dataset

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The Dark Energy Survey (DES) is a multi-probe experiment designed to constrain the nature of dark energy. One of the main dark energy probes it studies is galaxy clustering, focusing on the measurement of the Baryon Acoustic Oscillations (BAO) scale. In this work, we present new results from measuring the BAO signal using the final DES data set (DES Year-6). For this purpose, we have optimized the sample selection to maximize the BAO information in the $0.6 < z < 1.2$ redshift range. We have cross-calibrated the redshift distributions with three independent methods: one based on machine learning (DNF), a direct calibration using VIPERS, and clustering redshifts. We also present three analysis pipelines based on the angular correlation function (ACF), the angular power spectrum (APS) and the projected correlation function (PCF), respectively, which we validate with ~ 2000 ICE-COLA mock catalogs. Finally, we present a consensus result coming from the statistical combination of the three analyses. Our measurement has a precision of 2.1%, making it the tightest BAO measurement from a photometric survey ever, and the tightest overall for $z > 0.75$ at the end of Stage III.

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