

Abstract Submitted
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CenterFinder: Locating over-dense centers of baryon acoustic oscillations ZACHERY BROWN, YUJIE LIU, GEBRI MISHTAKU, REGINA DEMINA, University of Rochester, DESI COLLABORATION — Acoustic waves in the primordial Universe (baryon acoustic oscillations, BAO) generated spherical shells of matter over-density, which can be detected today as a preferential length scale between galaxies in redshift surveys. We propose a new algorithm, CenterFinder, which extends BAO detection beyond a simple length scale, to include the cosmic locations of these primordial over-densities. Our method creates a model template of the expected matter distribution around over-dense BAO centers, then convolves it with the matter distribution as traced by redshift surveys to achieve this goal. Using mock galaxy catalogs, we evaluate the success and robustness of the algorithm by cross-correlating our found BAO centers with the galaxies themselves. We hope to apply our method to future surveys like DESI, and to investigate cross-correlations between our BAO centers and other cosmic objects like clusters, voids, or other matter tracers.

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