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Constraining Dark Acoustic Oscillations with the High-Redshift UV Luminosity Function

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Many extensions of ΛCDM with additional complexity in the dark sector introduce modifications to the matter power spectrum, often appearing only at small scales. For models with interactions between a component of the dark matter and a dark radiation species at early times, the linear matter power spectrum incurs a suppression and dark acoustic oscillations (DAOs) on small scales. One probe of structure on these small scales is the UV luminosity function at high redshifts as measured by the Hubble space telescope. By comparing to these observations we compute new constraints on a generic DAO-type modification of the matter power spectrum, and interpret them in the context of the atomic dark matter model.

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