

The Initial Mass Function of Wd 1 from HST Astrometry and Photometry

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1. Abstract

One of the most massive young star clusters known in the Milky Way is Westerlund 1 (Wd 1) and it represents a more extreme environment for star formation than nearby, well-studied, and lower-mass star forming regions. This makes Wd 1 an ideal target for testing whether the initial mass function (IMF) is universal, as may be the case for the solar neighborhood, or favors high-mass star formation, as has been suggested theoretically and from some observational results. From new and archival HST observations of Wd 1, we have extracted high-precision proper motions and multi-band photometry that allows us to identify cluster members down to $<0.5 M_{\odot}$. We will present a comparison of our de-reddened color-magnitude diagrams to stellar evolution and atmosphere models, the resulting initial mass function, and measurements of the internal kinematic structure of the cluster. We will also discuss how Wd 1's IMF compares to IMF measurements in other clusters throughout the Milky Way and in a range of extra-galactic environments in an effort to determine how the star formation process varies with initial cloud conditions.

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