

Stellar Evolution with Open Clusters

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Accurate inference of stellar parameters and well-calibrated models are paramount to many fields in astronomy, including galactic archaeology and exoplanets. We use the framework developed as part of the MESA Isochrones and Stellar Tracks (MIST) project to compute a series of evolutionary models and assess the utility of various observational data sets for the task of constraining uncertain stellar physics parameters and inferring the properties of stars in open clusters. Using three well-studied open clusters as case studies, we demonstrate that a combination of well-calibrated models, high-quality data, and robust fitting tools are required for this task. We expect to be able to disentangle the subtle differences induced by the uncertain model parameters with a combination of exquisite photometry, distances, and membership identification for these nearby open clusters from Gaia in the next few years. With this approach, we hope to deliver sub-Gyr absolute age precision.

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