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# **Harmonizing Stellar Histories: Using Spectroscopy of Open Clusters to Calibrate Asteroseismic Ages**

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Precise stellar ages for field stars are still elusive today for several reasons. For example, there are many different methods to determine the ages of stars, and it is difficult to trace the formation history of field stars. Open clusters allow for some reduction of age errors since they are environments with different types of stars to study that formed at the same time from the same material. Current methods to determine age estimates of stars, such as spectroscopy and asteroseismology, individually have very large uncertainties. Combining these two age estimation methods would significantly reduce this uncertainty even further. For this study, metallicities and asteroseismology data for a set of open clusters are combined to produce a new asteroseismic age-metallicity-mass relation to reduce the uncertainty in age estimates of stars. While open clusters are ideal age calibrators, few have good asteroseismic data. To date, there have been no larger-scale surveys of open clusters that compare asteroseismology and spectroscopy estimates of stellar ages, due to the limits of area coverage from the Kepler mission. The approach of this study is to more than double the number of clusters with high-quality asteroseismology and high-resolution abundance determinations by observing a sample of 10 open clusters. These clusters were chosen because they overlapped with Kepler 2 (K2) campaign fields to utilize the asteroseismology observations of giant stars in the K2 fields. We analyze the clusters and use The Cannon to measure abundances of [Fe/H], [Mg/Fe], [Si/Fe], [Ni/Fe], [Ca/Fe], [Na/Fe], and [V/Fe] and determine cluster membership. Using this sample, we present a new asteroseismic age-metallicity-mass relation that improves the age precision for Milky Way disk field stars using asteroseismology.