Initial-Final Mass Relation of Massive White Dwarfs in the Open Cluster Messier 11

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The initial-final mass relation is a direct measure of the integrated mass loss of white dwarf progenitor stars. It provides the end state evolution of the cores of the asymptotic giant branch stars, whose models are complicated by intricate and delicate physics, especially in intermediate-mass (4-8 solar mass) progenitors. Additionally, the initial-final mass relation provides direct constraints on the upper mass limit of white dwarf progenitors. Despite significant ongoing efforts, the initial-final mass relation remains poorly constrained for intermediate-mass stars, due in large part to the steepness of the initial mass function and combination of data from multiple star clusters. Here we present initial results of a determination of the intermediate to high-mass initial-final mass relation in the rich open star cluster Messier 11. Archival data from the HST shows Messier 11 contains a well populated white dwarf cooling sequence, including candidates for ultra-massive white dwarfs. We use the HST multi-band photometry to calculate the mass and surface gravity of individual white dwarfs in the cluster, and from there determine each objects initial mass. We then describe potential implications our results have on the high-mass end of the initial-final mass relation.