

White dwarfs in the open star cluster NGC 188

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Scientific Category: RESOLVED STELLAR POPULATIONS

Scientific Keywords: WHITE DWARFS, STELLAR EVOLUTION AND MODELS, OPEN STAR CLUSTERS, ASTROMETRY

Instruments: WFPC2

Proprietary Period: 12

Orbit Request	Prime	Parallel
Cycle 16	35	0

Abstract

White dwarf cooling sequences represent the only ways in which we can determine ages of Galactic components such as the disk and the halo, and they are an independent check on main sequence ages of globular star clusters. These age measurements rely heavily on theoretical cooling models, many of which disagree by as much as a few gigayears for the coolest white dwarfs. Further, observations of the white dwarf sequence in the super metal-rich open cluster NGC 6791 have found a white dwarf age several gigayears younger than the accepted cluster age determined by main-sequence fitting. The white dwarf sequence of the solar-metallicity, 7-Gyr old open cluster NGC 188 can provide some much-needed insight into these uncertainties, but previous HST observations were too shallow to detect the oldest, faintest white dwarfs in the cluster. We propose deep imaging of two fields at the center of the cluster with the following goals: (1) To detect the end of the white dwarf cooling sequence, providing a much-needed empirical data point for cool white dwarf evolutionary models, (2) to compare the white dwarf luminosity function of NGC 188 with that of NGC 6791 to determine if the odd white dwarf sequence in the latter cluster is due to the cluster's high metallicity or due to a shortcoming in theoretical models, and (3) to determine via photometry the masses of white dwarfs formed by solar-mass stars, a quantity not yet empirically measured.

Investigators:

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Number of investigators: 7

Target Summary:

Target	RA	Dec	Magnitude
NGC188	00 47 0.0000	+85 14 30.00	V = 27.25 +/- 0.07

Observing Summary:

Target	Config Mode and Spectral Elements	Flags	Orbits
NGC188	WFPC2 Imaging F606W	DUP	11
NGC188	WFPC2 Imaging F814W	DUP	17
NGC188	WFPC2 Imaging F606W	DUP	3
NGC188	WFPC2 Imaging F814W	DUP	4

Total prime orbits: 35