



12483 - What is the origin of the hottest known white dwarf?

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> | <i>E-Mail</i> |
|--------------------------------------|---|-------------------------------|
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VISITS

| <i>Visit</i> | <i>Targets used in Visit</i> | <i>Configurations used in Visit</i> | <i>Orbits Used</i> | <i>Last Orbit Planner Run</i> | <i>OP Current with Visit?</i> |
|--------------|------------------------------|--|--------------------|-------------------------------|-------------------------------|
| 01 | (1) KPD0005+5106 | STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA | 2 | 10-Jun-2011 21:00:54.0 | yes |

2 Total Orbits Used

ABSTRACT

KPD0005+5106 is the hottest known white dwarf ($T_{\text{eff}}=200,000$ K). It has a helium-dominated atmosphere with trace amounts of light metals. Our recent analysis places the star in a region of the HRD where very weak stellar winds prevent gravitational settling of heavy elements. Therefore, the surface composition allows to conclude on the evolutionary history. We speculate that KPD0005+5106 represents a third post-AGB evolutionary sequence, which is distinct from the canonical hydrogen-rich and hydrogen-deficient sequences. The star could be the long-sought progeny of the RCrB stars, which are believed to be the result of a double-degenerate merger. We found that the metal abundances in KPD0005+5106 are rather similar to those in RCrB stars, however, a claim on the evolutionary link is premature. The abundance determinations for KPD0005+5106 are afflicted with large errors because of the relatively large uncertainty in T_{eff} . Our immediate aim is to use ionization balances of metals in order to

determine T_{eff} to high precision, which is a prerequisite to tightly constrain abundances. HST-UV spectroscopy is the only means to reach this goal.

OBSERVING DESCRIPTION

We will perform short-slit (0.2"x0.2") medium-dispersion UV spectroscopy of KPD0005 in the STIS/FUV-MAMA and NUV-MAMA configurations with gratings E140M and E230M (two wavelength settings), respectively, in order to cover the wavelength range 1150-3100Å. This provides the spectral resolution ($\sim 30,000$) needed for the quantitative analysis of narrow metal lines. STIS ETC was used to determine exposure times necessary to achieve the required $S/N \sim 20-40$.

Proposal 12483 - Visit 01 - What is the origin of the hottest known white dwarf?

Sat Jun 11 01:01:00 GMT 2011

| Visit | | Proposal 12483, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/FUV-MAMA, STIS/NUV-MAMA Special Requirements: (none) | | | | | | | | |
|---------------|-----------------|---|-------------------------------|---|-----------------|---------------|-----------------------|-----------|-------------------------|-------|
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Fluxes | Miscellaneous | | | | |
| | | (1) | KPD0005+5106 | RA: 00 08 18.1500 (2.0756250d) Dec: +51 23 17.00 (51.38806d) Equinox: J2000 | | V=13.32+/-0.1 | Reference Frame: ICRS | | | |
| Exposures | # | Label (ETC Run) | Target | Config,Mode,Aperture | Spectral Els. | Opt. Params. | Special Reqs. | Groups | Exp. Time/[Actual Dur.] | Orbit |
| | 1 | | (1) KPD0005+5106 | STIS/CCD, ACQ, F28X50LP | MIRROR | | | | 0.2 Secs | |
| | | | | | | | | | [==>] | [1] |
| | 2 | (STIS.A228 370) | (1) KPD0005+5106 | STIS/NUV-MAMA, ACCUM, 0.2X0.2 | E230M 1978 A | | | | 300 Secs | |
| | | | | | | | | | [==>] | [1] |
| | 3 | (STIS.A228 345) | (1) KPD0005+5106 | STIS/NUV-MAMA, ACCUM, 0.2X0.2 | E230M 2707 A | | | | 450 Secs | |
| | | | | | | | | [==>] | [1] | |
| 4 | (STIS.A228 359) | (1) KPD0005+5106 | STIS/FUV-MAMA, ACCUM, 0.2X0.2 | E140M 1425 A | | | | 1215 Secs | | |
| | | | | | | | | [==>] | [1] | |
| 5 | (STIS.A228 359) | (1) KPD0005+5106 | STIS/FUV-MAMA, ACCUM, 0.2X0.2 | E140M 1425 A | | | | 3193 Secs | | |
| | | | | | | | | [==>] | [2] | |

