11132 - Constraining the age of the AB Dor system

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) AB-DOR-B	WFPC2	2	17-Jan-2008 21:49:42.0	yes

2 Total Orbits Used

ABSTRACT

The zero-age main sequence K-type star AB Dor, with an age of 25 to 125 Myr, is the most active young star in the solar neighbourhood. It is part of a quadruple system of young stars. The mass of AB Dor C, the closest and lowest mass companion, has been derived from astrometric observations (with the VLA and adaptive optics at the VLT) to 94+-3 times the mass of Jupiter. The low mass (close to the hydrogen burning limit) combined with the young age makes AB Dor C a unique calibration source for evolutionary tracks for very low-mass stars and brown dwarfs, provided that a precise age estimate can be derived for the system. We propose to use the HST planetary camera to obtain resolved component photometry of the M-type pre-main sequence star AB Dor Ba and Bb in order to derive individual spectral types and luminosities, which will enable us to age-date the AB Dor system to better than +-20 Myr. In addition, the observations will help to constrain the Ba/Bb orbit, and hence to derive dynamical mass

estimates as well.

OBSERVING DESCRIPTION

Seven exposures in six filters (F502N, F555W, F622W, F658N, F791W and F850LP) will be taken within a four-point dither pattern. Two exposures per dither position are taken with the F502N filter, once with a short exposure time in order not to saturate AB Dor A, and once with a long exposure time in order to achieve a good SNR for AB Dor Ba/Bb. Both AB Dor A and AB Dor Ba/Bb are included in all frames. Since a little bit of time remains in the second orbit after the dither loop has finished, we include also one exposure in the F439W filter, which can be used to estimate veiling effects of material accreting on the stars in the UV.

Changed F658N filter to the correct WFPC2 H-alpha filter F656N, per the IS suggestion.

Visit

Proposal 11132, Visit 01, implementation Fri Jan 18 02:49:49 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFPC2-BOX	Coordinate Frame=POS-TARG		(1-7)
	Purpose=DITHER	Pattern Orientation=26.56505		
	Number Of Points=4	Angle Between Sides=143.1301		
	Point Spacing=0.559017	Center Pattern=false		
	Line Spacing=0.559017			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AB-DOR-B	RA: 05 28 44.5000 (82.1854167d)		V=13	Reference Frame: SIMBAD
		Dec: -65 26 47.00 (-65.44639d)			
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. However, due to the presence of AB Dor A, the coordinates of AB Dor B were only accurate down to an arcminute. The coordinates were therefore subsequently changed based on NACO images to more accurately represent the position of AB Dor B.

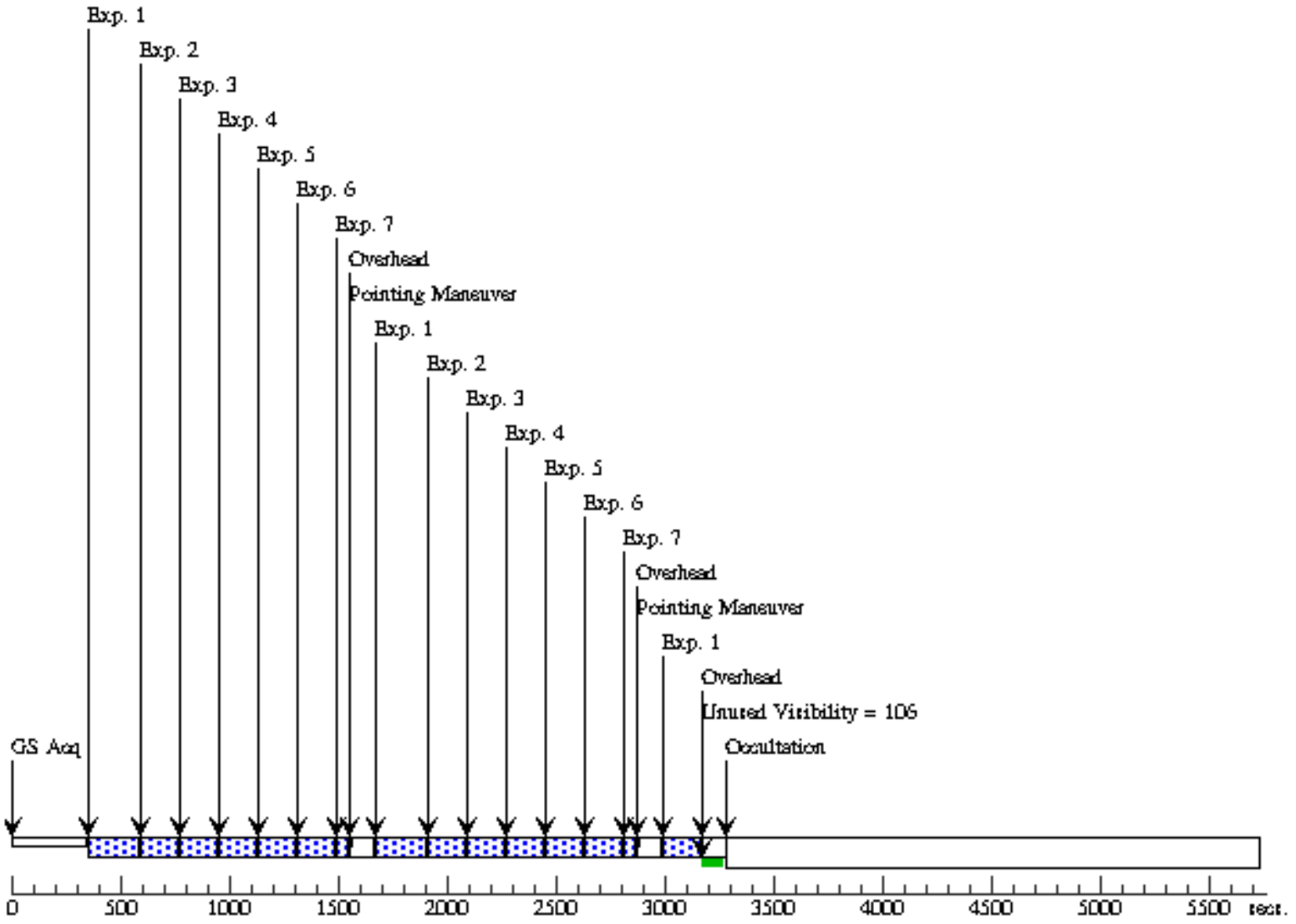
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F622W	ATD-GAIN=15		Pattern 1-7 (1)	2.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	***[2]***
2		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F656N	ATD-GAIN=15		Pattern 1-7 (1)	40.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	
3		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F791W	ATD-GAIN=15		Pattern 1-7 (1)	2.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	
4		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F850LP	ATD-GAIN=15		Pattern 1-7 (1)	10.0 Secs	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
5		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F555W	ATD-GAIN=15		Pattern 1-7 (1)	4.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
6		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F502N	ATD-GAIN=15		Pattern 1-7 (1)	1.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
7		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F502N	ATD-GAIN=15		Pattern 1-7 (1)	40.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
8		(1) AB-DOR-B	WFPC2, IMAGE, PC1	F439W	ATD-GAIN=15			40.0 Secs	
								[==>]	***[2]***

Orbit Structure



Orbit Structure (continued)