



## 15855 - A new low-metallicity LBV in M33: Is it a blue straggler?

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

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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) MCA1-B	WFC3/UVIS	2	14-Oct-2019 12:00:48.0	yes

2 Total Orbits Used

### ABSTRACT

Luminous blue variables (LBVs) are evolved massive stars that undergo dramatic mass loss and irregular variability. Whether LBVs originate from a single massive progenitor or through binary interaction is still debated. They statistically prefer isolated locations in star forming galaxies, far away from O-type stars, which indicates a likely binary origin. Located in a young stellar cluster, the newly discovered LBV outburst MCA1-B in M33 affords us the rare opportunity to independently age-date an LBV based on the ages of the other cluster members. By determining the cluster turn off mass we can ascertain if the LBV is overluminous compared to the rest of the cluster, and therefore determine decisively if it has been rejuvenated through binary evolution. If it does appear to be younger than the surrounding population, we can determine quantitatively how much mass it has gained or what the likely masses of the merger components were. Only now while the LBV is in a fainter, quiescent phase and only with the UV sensitivity and spatial resolution of WFC3 can we get the UV-to-optical imaging needed to create accurate color-magnitude diagrams of the LBV's host cluster in order to age-date MCA1-B. The LBV eruption of MCA-1B was also unusually hot at peak, which may be linked to its low-metallicity environment in the outskirts of M33; this may provide critical clues about the physical LBV instability.

**OBSERVING DESCRIPTION**

The observations are all set up in one visit of two orbits, but these orbits can be separated as need be. The object(s) of interest are bright enough to likely not need post-flash, but please advise if this should be added.

There are no special orients needed, although we would prefer both orbits taken at the same orient if they need to be separated into separate visits.

We are using full frame instead of sub-array because we need the whole nearby stellar population.

Proposal 15855 - Visit 01 - A new low-metallicity LBV in M33: Is it a blue straggler?

Mon Oct 14 16:00:49 GMT 2019

Visit	<b>Proposal 15855, Visit 01, implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: (none)									
	Diagnostics	(Exposure 1 (Pattern 1, Exps 1-2 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 2 (Pattern 1, Exps 1-2 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 3 (Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 4 (Pattern 1, Exps 4-5 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 5 (Pattern 1, Exps 4-5 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 6 (Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser								
Patterns		#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false	(1-2), (4-5)					
Fixed Targets		#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
		(1)	MCA1-B	RA: 01 32 37.6800 (23.1570000d) Dec: +30 40 5.60 (30.66822d) Equinox: J2000  <i>Comments:</i> Category=STELLAR CLUSTER Description=[OB ASSOCIATION, OPEN CLUSTER, YOUNG ASSOCIATION] Extended=NO		V=20	Reference Frame: ICRS			
Exposures		#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]
	1		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F606W			Pattern 1, Exps 1-2 in Visit 01 (1)	216 Secs (432 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F225W			Pattern 1, Exps 1-2 in Visit 01 (1)	740 Secs (1480 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F438W				320 Secs (320 Secs) [=>]	[1]
	4		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F814W			Pattern 1, Exps 4-5 in Visit 01 (1)	271 Secs (542 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[2]
	5		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F336W			Pattern 1, Exps 4-5 in Visit 01 (1)	700 Secs (1400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[2]
	6		(1) MCA1-B	WFC3/UVIS, ACCUM, UVIS2	F438W			POS TARG -3.4088 166189286015E-4,-1 .425343380764952	320 Secs (320 Secs) [=>]	[2]

