11993 - High Resolution Imaging of a Binary Supermassive Black Hole Candidate

Cycle: 16, Proposal Category: GO/DD

(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) SDSSJ153636.22+044127.0	WFPC2	1	06-Feb-2009 21:17:24.0	yes

1 Total Orbits Used

ABSTRACT

Dithered high resolution images of a supermassive binary black hole candidate SDSS J153636.22+044127.0 will be obtained with the WFPC2/PC in F675W. This QSO was identified in November, 2008 by a principal components analysis of the ~ 17,500 QSOs in the SDSS DR7 sample. It is unique among all known QSOs in having two broadline regions, indicative of two supermassive black holes being actively fed. It is the best candidate for a supermassive binary black hole known. Such binaries should be common in the Universe and play key roles in the formation and evolution of galaxies, yet no convincing examples had been identified prior to this QSO. The HST imaging should be able to constrain two alternative hypotheses that this object is 1) the site of a black hole ejected from a nucleus by a multi-body interaction, or 2) a simple line of sight superposition of two unrelated AGN. With the superb spatial resolution of HST, two AGN separated by > 300pc (projected) should be readily visible.

OBSERVING DESCRIPTION

The observational goal is to test if the QSO is a pure point source. We will conduct F675W imaging in the PC1 CCD of WFPC2. The observations will be dithered in a 2X2 pattern of 0.5 pixel steps (with a CR-split at each position) to provide a Nyquist-sampled superimage. The final resolution should be ~0.06" FWHM. The F675W bandpass covers H-beta for both redshift systems, as well as the [O III] lines of the r-system. With the left-over time in the orbit, we have added a single CR-split F439W exposure to add color information and to provide slightly better resolution.

Visit

Proposal 11993, Visit 01, implementation Sat Feb 07 02:17:28 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: PCS MODE FINE

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFPC2-BOX	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=26.56505		
	Number Of Points=4	Angle Between Sides=143.130102		
	Point Spacing=0.559017	Center Pattern=false		
	Line Spacing=0.559017			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ153636.22+044127.0	RA: 15 36 36.2200 (234.1509167d) Dec: +04 41 27.30 (4.69092d) Equinox: J2000		V=17.2+/-0.05 AB(675W)=16.73	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) SDSSJ153636.22+044127.0	WFPC2, IMAGE, PC1	F675W	ATD-GAIN=7; CR-SPLIT=0.5		Pattern 1-1 (1)	160 Secs	
								[==>(Pattern 1, Split 1)] *[==>(Pattern 1, Split 2)]* *[==>(Pattern 2, Split 1)]* *[==>(Pattern 2, Split 2)]* *[==>(Pattern 3, Split 1)]* *[==>(Pattern 3, Split 2)]* *[==>(Pattern 4, Split 1)]* *[==>(Pattern 4, Split 2)]*	***[1]***
2		(1) SDSSJ153636.22+044127.0	WFPC2, IMAGE, PC1	F439W	CR-SPLIT=0.5; ATD-GAIN=7			200 Secs	
								[==>(Split 1)] *[==>(Split 2)]*	***[1]***

Orbit Structure