



Observing Application

Date : Oct, 23 2012
 Proposal ID : VLA/12B-394
 Legacy ID : AK812
 PI : Namir Kassim
 Type : Director's Discretionary
 Time - Target of Opportunity
 Category : Energetic Transients and Pulsars
 Total Time : 9.0

Low frequency probe of the supermassive black hole region at the Galactic Center

Abstract:

The recent detection (Gillessen et al. 2012) of an ionized gas cloud approaching within 3100 Schwartzchild Radii of the Milky Way's supermassive black hole (SMBH) in 2013 provides an unprecedented opportunity to probe the environment of the SMBH through low frequency observations of Sgr A*. We propose P-band DDT observations this fall and winter while the VLA is in the A-configuration, as Sgr A* will not be detectable at 330 MHz in upcoming compact array configurations. The observations would provide a baseline measurement and possible early detection at sub-GHz frequencies which would complement planned GHz observations, breaking parameter degeneracies between the two regimes. The cloud collision offers an amazing opportunity to dynamically probe the radial profile of cool ionized gas around Sgr A* as the leading edge of the cloud plummets through the SMBH potential. Decoupling the superposition of extrinsic (thermal absorption) and intrinsic (synchrotron self-absorption) physical processes will be challenging. Here the unprecedented (~200 MHz) bandwidth of the new 330 MHz Low Band system can separate the effects. We propose three 3-hr epochs to better decouple the competing processes and to probe the ionized gas surrounding the SMBH as the gas cloud approaches.

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Related proposals:

AH775, AH820, AH894, AH980

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Single Pointing(s)

VLA Resources

Name	Conf.	Frontend & Backend	Setup
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Name	Conf.	Frontend & Backend	Setup
P-Band	A	L Band 20 cm 1000 - 2000 MHz WIDAR RSRO	Comments: We request P-Band observations with maximum bandwidth and number of channels available. (We were not able to select P-Band under the Receiver menu.)

Testing Resource Images

Sources:

Name	Position		Velocity		Group
Sgr A	Coordinate System	Equatorial	Convention	Radio	GC
	Equinox	J2000			
	Right Ascension	17:45:40.0 00:00:00.0	Ref. Frame	LSRK	
	Declination	-29:00:28 00:00:00	Velocity	0.00	

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
Sgr A*	3.00	3	14 day	00:00:00	24:00:00	0

Session Constraints:

Name	Constraints	Comments
Sgr A*	To avoid interference, etc., from the sun nearing the Galactic center, we request two epochs before December 8 scheduled at least two weeks apart. Also, a third epoch after Dec. 28, but still in A configuration.	We request the observations be taken as near to transit as possible.

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
Sgr A*	Sgr A	P-Band	3.0 hour	5 mJy/bm	

Present for observation: yes

Staff support: Consultation

Plan of Dissertation: no