



Observing Application

Date : Aug, 24 2011
 Proposal ID : VLA/11B-214
 Legacy ID : AB1422
 PI : Michael Busch
 Type : Director's Discretionary
 Time - Target of Opportunity
 Category : Solar System, Stars,
 Planetary Systems
 Total Time : 10.0

Thermal Radiometry Of Near-Earth Asteroid 2005 YU55

Abstract:

Ground-based remote sensing observations have provided most of our knowledge of the near-Earth asteroids. However, few remote sensing techniques provide information on the sub-surfaces of asteroids. We propose a new technique: long-wavelength thermal radiometry. Thermal flux measurements at mm-to-cm wavelengths would allow us to determine the temperature and heat capacity of a target asteroid's subsurface to depths of 60-90 cm.

Only objects passing very close enough to Earth are bright enough for their thermal emission to be detectable at long wavelengths, and to date no near-Earth asteroid has been observed with long-wavelength radiometry. 2005 YU55 will make a very close (350,000 km) approach to Earth in November 2011. We request measurements of YU55's brightness at C, X, Ku, Ka, Q, and W bands, over a 10-hour period centered on the close approach.

These observations will complement radar imaging of YU55 scheduled at Arecibo, GBT, and Goldstone and radar speckle tracking scheduled at Arecibo and the VLBA.

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Related proposals:

BB302, QB119, Radar Imaging Proposals at Arecibo and Goldstone

Joint:

Joint with GBT

Observing type(s):

Continuum, Solar System

VLA Resources

Name	Conf.	Frontend & Backend	Setup
C_band	D	C Band 6 cm 4000-8000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 5000.0,6000.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz
X_band	D	X Band 3.6 cm 8000 - 12000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 8500.0,9500.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz
Ku_band	D	Ku Band 2 cm 12000 - 18000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 13500.0,14500.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz
Ka_band	D	Ka Band 0.9 cm 26500 - 40000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 32500.0,33500.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz
Q_band	D	Q Band 0.7 cm 40000 - 50000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 40500.0,41500.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz

Sources:

Name	Position		Velocity		Group
2005YU55	Coordinate System	Equatorial	Convention	Radio	2005 YU55
	Equinox	J2000			
	Right Ascension	00:00:00.0	Ref. Frame	LSRK	
		00:00:00.0			
Declination	+00:00:00.0	Velocity	0.00		
	00:00:00.0				

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
Close_Approach	10.00	1	0 day	00:00:00	24:00:00	0

Session Constraints:

Name	Constraints	Comments
Close_Approach	Must be scheduled as described in Science Justification.	YU55's rapid sky motion makes these ECSO observations. Bryan Butler is the ECSO resource for this project.