VSOP PROPOSAL COVER SHEETS

ID :

TR :

SR :

DEADLINE : 17 November, 1995
SEND TO : VSOP SOG, ISAS, 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229, JAPAN

Please read Appendix C of Announcement of Opportunity for details on how to fill in this Cover Sheet.

(1) Date prepared : November 11, 1995

(2) Proposal title : Extragalactic OH Masers

(3)	INVESTIGATORS	INSTITUTION
P.I.	Karl M. Menten	Harvard-Smithsonian CfA
co-I.	Lincoln J. Greenhill	Harvard-Smithsonian CfA
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co-I.		
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(4) Principal Investigator (or contact person) details...

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(5) Proposal Abstract :

We propose VSOP observations to map the two strongest OH megamasers Arp 220 and III Zw 35. Many important questions remain to be answered concerning the nature of these "megamaser" galaxies. Of central importance is the question of the relation between of the OH maser emission and the active nuclei in these systems. Some models suggest that the masers are low-gain amplifiers and arise from regions at distances of a few hundred pc from the galactic nuclei, while recent transatlantic VLBI observations of Arp 220 indicate high-gain maser emission, with the bulk of the emission being emitted from a region smaller than 1 pc. Through VSOP maps of these two megamasers, we hope to obtain sufficient angular resolution to settle this controversy, to spatially resolve the OH velocity field, and to determine the enclosed masses in these systems.

(6) Proposal Category (indicate all that apply):

Object type:

☑ AGN, ☑ Masers, ☐ Stellar, ☐ Other :

Experiment type:

☑ Single-observation, ☐ Monitoring, ☐ Polarization,
☐ Time-critical, ☐ Target of Opportunity, ☐ Other :

(7) VSOP spacecraft observing mode (see Section 3 and Table 5 of the VSOP Proposer's Guide):

☑ 2 channel x 16 MHz, 2-bit (Standard mode),
☐ 2 channel x 32 MHz, 1-bit,
☐ 1 channel x 32 MHz, 2-bit

Phase calibration tones:

☐ On (Standard continuum mode),
☑ Off (Standard spectral line mode)

(Include justification of any non-standard choice at (14) below)

(8) Ground radio telescope setup

Polarization :

☑ VSOP Standard (IEEE LCP), ☐ Non-standard :

Recording mode :

☑ As for VSOP spacecraft (Standard), ☐ Other :

(9) Investigator participation in scheduling

☐ PI (or co-I) wishes to participate in scheduling ground radio telescopes
☐ PI (or co-I) wishes to participate in scheduling the space radio telescope

(10) Preferred correlator (see Sections 9.11 and 12 of VSOP Proposer's Guide):

☐ No preference, ☐ Mitaka, ☑ Socorro, ☐ Other :

(11) Preferred post-correlation data analysis location:

☑ Home Institution, ☐ Mitaka, ☐ NRAO AOC, ☐ JIVE, ☐ Other

(12) Post-correlation data analysis assistance required:

☐ None, ☑ Consultation, ☐ Extensive help

(13) Details of proposed experiments

An 'experiment' is one or more observations of one source in one wavelength band.
A request to observe the same source in all 3 wavelength bands requires 3 columns to be filled in.
To observe the same source at the same frequency multiple times – a 'monitoring experiment' – requires only one column to be filled in.
Number of experiments in this proposal: 2

	Experiment 1	Experiment 2	Experiment 3	Experiment
Source name	ARP 220	III ZW 35		
RA (hh mm ss.s)	15 32 47.0	01 41 47.9		
Dec (dd mm ss)	+23 40 10	+16 51 06		
J2000 or B1950?	B1950	B1950		
Observing frequency band (GHz)	1.6	1.6		
Continuum observations:				
Standard VSOP freq. channels?	☐	☐	☐	☐
Channel A range (MHz)				
Channel B range (MHz)				
Spectral line observations:				
Ch.A spectral line rest freq. (MHz)	1667.359	1667.359		
Ch.A LSR velocity (km/s)	5,350	8,250		
Ch.B spectral line rest freq. (MHz)				
Ch.B LSR velocity (km/s)	adjacent 16 MHz	adjacent 16 MHz		
Min. spectral channels per IF channel	64	64		
Correlator averaging time (sec)	0.52	0.52		
FWHM of field of view required (mas)	1000	1000		
No. of correlating passes (if >1)				
Measured total flux density (Jy)	0.3 (line peak)	0.04 (cont.); 0.2 (line)		
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.1 (line est.)	0.04 (cont. est.)		
Image RMS needed (mJy/beam)	1	1		
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	12	12		
Number of large telescopes	3	3		
Suggested array given at Item (14)	☑	☑	☑	☐
Minimum acceptable:				
Number of medium telescopes	10	10	10	
Number of large telescopes	1	1		
Suggested array given at Item (14)	☑	☑	☑	☐
Length of observation:				
Preferred length (orbits)	4	4		
Minimum acceptable length (orbits)	2	2		
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)				
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☐	☐
Preferred range of dates for scheduling	98-07-01	96-10-01		
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	98-09-01	96-12-31		
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

(14) Additional notes to the scheduler :

Preferred array: EF, JO, NO, MC, VL, & VLBA
Minimum array: VL, & VLBA

For discussion of estimated flux densities on > 5000 km baselines see attached section on Technical Considerations.

(15) Attach a scientific and technical justification, not in excess of 2 pages of text and 2 pages of figures. Up to one page of (u,v) plots per source may optionally be included.
(Refer to the VSOP Announcement of Opportunity for detailed instructions.)
Preprints and reprints will not be forwarded to the Scientific Review Committee.

Send two paper copies of the complete proposal to:

VSOP Observing Proposals
VSOP Science Operations Group
Institute of Space and Astronautical Science
3-1-1 Yoshinodai, Sagamihara
Kanagawa 229 JAPAN

In addition, e-mail the completed LaTeX file to submit@vsopgw.isaslan1.isas.ac.jp

Cover Sheets of accepted proposals will be made available to the astronomical community.

Proposals must be received at ISAS by 17 November 1995