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 : 3 Nov 1995

(2) Proposal title : Nanoarcsecond Study of the Vela Pulsar

(3)	INVESTIGATORS	INSTITUTION
P.I.	C.R. Gwinn	UC Santa Barbara
co-I.	M.C. Britton	UC Santa Barbara
co-I.	J.E. Reynolds, D.L. Jauncey	ATNF
co-I.	C.E. Flanigan	Hartebeesthoek R.A.O.
co-I.	P.M. McCulloch	University of Tasmania
co-I.	R.A. Preston	JPL
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(4) Principal Investigator (or contact person) details...

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(5) Proposal Abstract :

We propose VSOP observations of the Vela pulsar in the speckle limit of interstellar scattering. We plan to use scattering material in the Vela supernova remnant surrounding the pulsar as a lens with a diameter of 4 AU, to image the pulsar with angular resolution of 20 nanoarcseconds. We expect that these observations will improve understanding of the magnetospheres and emission mechanisms of radio pulsars.

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

Object type:

☐ AGN, ☐ Masers, ☐ Stellar, ☑ Other : Pulsar

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 : Standard, plus RCP at 2-pol'n GRTs

Recording mode :

☐ As for VSOP spacecraft (Standard), ☑ Other : Standard, plus RCP at 2-pol'n GRTs

(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: 1

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Source name	Vela Pulsar			
RA (hh mm ss.s)	08:35:20.68			
Dec (dd mm ss)	-45:10:35.8			
J2000 or B1950?	J2000			
Observing frequency band (GHz)	1.6 GHz			
Continuum observations:				
Standard VSOP freq. channels?	☑	☐	☐	☐
Channel A range (MHz)				
Channel B range (MHz)				
Spectral line observations:				
Ch.A spectral line rest freq. (MHz)	Any			
Ch.A LSR velocity (km/s)	spectral			
Ch.B spectral line rest freq. (MHz)	range			
Ch.B LSR velocity (km/s)	1.66-1.7 GHz			
Min. spectral channels per IF channel	1024			
Correlator averaging time (sec)	5			
FWHM of field of view required (mas)	5			
No. of correlating passes (if >1)	4 (gates)			
Measured total flux density (Jy)	1.1 Jy			
Measured correlated flux density on > 5000 km baseline (Jy)	1.1 Jy (100%)			
Image RMS needed (mJy/beam)				
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	8			
Number of large telescopes	2			
Suggested array given at Item (14)	☑	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	2			
Number of large telescopes	1			
Suggested array given at Item (14)	☑	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3			
Minimum acceptable length (orbits)	1			
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 (for monitoring experiments give range for 1st observation only)	to	to	to	to
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

(14) Additional notes to the scheduler :
We wish to observe in standard VSOP mode, and to record RCP as well at those ground radio telescopes capable of recording both polarizations.
We wish to observe in spectral-line mode to observe pulsar scintillations; any frequency between 1.66 and 1.73 GHz is usable.
We request correlation with pulsar gating, if it is operational at Socorro or Mitaka. If gating is operational, we wish to correlate with 4 gates.

We suggest as a preferred array the large telescopes TI PA, and the medium telescopes HO HT VLBA.
We suggest as a preferred minimum array the large telescope TI and the medium telescopes HO HT.

(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