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 : 13-Nov-1995

(2) Proposal title : SVLBI Imaging of the Jets of Cyg A with Sub-parsec Resolution

(3)	INVESTIGATORS	INSTITUTION
P.I.	T.P. Krichbaum	MPIfR, Bonn, Germany
co-I.	W. Alef	MPIfR, Bonn, Germany
co-I.	A. Witzel	MPIfR, Bonn, Germany
co-I.	D.A. Graham	MPIfR, Bonn, Germany
co-I.	J.A. Zensus	NRAO, Charlottesville, USA
co-I.		
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(4) Principal Investigator (or contact person) details...

Name : T.P. Krichbaum
Address : Max-Planck-Institut
: Auf dem Hügel 69
: D-53121 Bonn
: Germany

Internet : tkrichbaum@mpifr-bonn.mpg.de
Other e-mail :
Fax : +49-228-525-229
Telephone : +49-228-525-295

(5) Proposal Abstract :

Cygnus A is commonly regarded as 'THE' archetypical radio galaxy. From ongoing 22 & 43 GHz VLBI monitoring we find a highly complex two sided core-jet morphology, subluminal motion with $\beta_{app} \approx 0.1 - 0.2$, and a jet/counter-jet ratio in the range of $2 \leq R \leq 30$. The exact values of speed and jet/counter-jet ratio depend on the registration of the core position, which still is uncertain. We propose to make a high resolution full polarization map of Cygnus A with high dynamic range at 5 GHz. With an observing beam of ~ 0.2 mas (spatial resolution: 0.15 pc), comparable to that of our 22 GHz images, exact positioning of the VLBI-core and spectral imaging of jet and counter-jet will become possible. This will result in a more accurate determination of jet/counter-jet ratio and velocities on both sides of the jet. Thus important intrinsic jet properties could be derived, putting hard limits on jet-models and unification scenarios.

(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 : best UV coverage

(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 : (see (14) below)

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

Recording mode :

☐ As for VSOP spacecraft (Standard), ☑ Other : 4 chan x 16 MHz x 2-bit (see (14))

(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	Cygnus A			
RA (hh mm ss.s)	19 59 28.35839			
Dec (dd mm ss)	40 44 02.4249			
J2000 or B1950?	J2000			
Observing frequency band (GHz)	5			
Continuum observations:				
Standard VSOP freq. channels?	☑	☐	☐	☐
Channel A range (MHz)				
Channel B range (MHz)				
Spectral line observations:				
Ch.A spectral line rest freq. (MHz)				
Ch.A LSR velocity (km/s)				
Ch.B spectral line rest freq. (MHz)				
Ch.B LSR velocity (km/s)				
Min. spectral channels per IF channel				
Correlator averaging time (sec)				
FWHM of field of view required (mas)				
No. of correlating passes (if >1)				
Measured total flux density (Jy)	1.0			
Measured correlated flux density on > 5000 km baseline (Jy)	> 0.15			
Image RMS needed (mJy/beam)	0.1			
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	13			
Number of large telescopes	4			
Suggested array given at Item (14)	☑	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	8			
Number of large telescopes	2			
Suggested array given at Item (14)	☑	☐	☐	☐
Length of observation:				
Preferred length (orbits)	4			
Minimum acceptable length (orbits)	3			
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	190			
'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)	98-04-01 to 98-08-30	to	to	to
For monitoring programs:				
Number of observations	1			
Mean interval (days)				
Acceptable variance from mean (days)				

(14) Additional notes to the scheduler :

Pref Array = VLBA, EB, MC, NO, JO, NR, VL, UD
Med. Array = VLBA, EF
Min. Array = EVN, EF, UD

If tape resources are granted for dual polarization recording on the ground array, this need not be a full 256 Mbps mode. The aggregate bit rate could be reduced by preferential recording during periods at which coverage on the ground-space baselines is maximized. Limited observations of standard polarization calibrators would be necessary on the ground array (see (9) above).
An *optional* request for dual polarization recording is being made for the GRT, subject to the availability of tape resources. If not granted the standard VSOP and GRT mode is implied in (8) above.

(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