VSOP AO5 PROPOSAL COVER SHEETS

DEADLINE : 1 February, 2001
SEND TO : VSOG, ISAS, 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229-8510, JAPAN

(1) Date prepared : 30 January, 2001

(2) Proposal title : Probing the center of activity in a CSS superluminal quasar 3C 138

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(5) Proposal Abstract :

We propose the first space VLBI observations of a CSS superluminal quasar 3C 138 at both 1.6 and 5 GHz to probe the fine structure within its central 10 mas. We aim to clearly separate the two compact knots for the first time at 1.6 GHz. This will enable us to obtain the spectral index for each component and then to determine the location of the central activity. These new data will also be used to refine the measurement of the superluminal speed, which has implications for models attempting to explain the observed large-scale asymmetrical lobes. We also hope to confirm the core position offset in 3C 138 that can be well accounted for by a frequency dependent shift of the synchrotron self-absorbed core. The fact that superluminal motion is not common in CSS sources makes it further interesting to compare 3C 138 with other two superluminal CSS quasars (3C 216 and 3C 446) that have already been imaged with VSOP.

(6) Proposal Category (indicate all that apply):
Object type:
☑ AGN, ☐ Maser, ☐ Stellar, ☐ Pulsar, ☐ Other :
Observation type:
☑ Continuum, ☐ Spectral Line, ☐ Polarization, ☐ Time critical,
☐ Phase-reference, ☐ Other :

(7) Number of proposed experiments

An 'experiment' is one or more observations of one source at a fixed HALCA set-up. A request to observe the same source at 1.6 GHz and separately at 5 GHz requires two columns to be filled in in item (8) below. A request to observe the same source with HALCA simultaneously observing at 1.6 GHz and 5 GHz requires one column to be filled in. Multi-epoch observations of the same source at the same frequency – a 'monitoring experiment' – requires only one column to be filled in. Suggested observing dates, especially for for time-critical and monitoring experiments, should be specified in item (11).

The number of experiments in this proposal is: 2

(8) Details of proposed experiments

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Source name (J*hhmm*±*ddmm*)	J0521+1638	J0521+1638		
Alternative name	3C 138	3C 138		
RA(J2000) (hh mm ss.ssss)	05 21 09.8860	05 21 09.8860		
Dec(J2000) (dd mm ss.sss)	+16 38 22.051	+16 38 22.051		
Observing frequency band (GHz)	1.6	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) FWHM of field of view required (mas)				
Min. spectral channels per IF channel	128	128		
Correlator averaging time (sec)				
No. of correlating passes (if >1)				
Total flux density (Jy)	4.0	9.5		
Correlated flux (mJy)	120-350	70-130		
Ground Radio Telescopes: Suggested array given at Item (11)?	 ☑	 ☑	 ☐	 ☐
GRT observing mode: 128Mbps LCP (standard) 128Mbps LCP/RCP 256Mbps LCP/RCP	 ☑ ☐ ☐	 ☑ ☐ ☐	 ☐ ☐ ☐	 ☐ ☐ ☐
Preferred correlator: No preference Mitaka Penticton Socorro	 ☑ ☐ ☐ ☐	 ☑ ☐ ☐ ☐	 ☐ ☐ ☐ ☐	 ☐ ☐ ☐ ☐
Monitoring programs: Number of observations Mean interval (days)				
Related VSOP proposal code(s)				

(9) VSOP spacecraft observing mode (see Section 3 and Table 2 of the VSOP Proposer's Guide):

- [x] 2 channel x 16 MHz, 2-bit (Standard mode),
- [ ] Other:

Phase calibration tones:

- [x] On (Standard continuum mode),
- [ ] Off (Standard spectral line mode)

(Include justification of any non-standard choice at (11) below)

(10) Assistance with preparation of ground telescope schedule files:

[ ] VSOG assistance requested, [ ] Consultation desired, [x] No assistance required

(11) Additional notes to the scheduler :

Based on our simulation with source structure parameters, we found it crucial to have at least one large ground telescope (such as the Effelsberg 100-m radio telescope or phased VLA) to participate in (at least) the 5 GHz observations. This will ensure the positive (5σ) detection of fringes as weak as about 30 mJy (with 400 s integration time and 16 MHz bandwidth) on that baseline to HALCA at both frequencies.

A careful selection of observing epoch will also help. We suggest observations to be done during the mid-September in the AO5 period, which will provide an excellent (u,v) coverage with a gradual change in the length of space baselines, from as short as about 1 500 km to the longest 30 000 km, (more importantly) roughly along the position angle of the compact core structure. These shorter ground-space baselines are very important for the fringe search as well as for the calibration and imaging.

(12) Attach a scientific and technical justification, not in excess of 2 pages of text and 2 pages of figures. Refer to the VSOP Announcement of Opportunity for detailed instructions. Preprints and reprints will not be forwarded to the Scientific Review Committee.

EITHER e-mail the completed LaTeX file to submit@vsop.isas.ac.jp and 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 229-8510 JAPAN

OR e-mail the completed LaTeX Cover Sheets file and, in a separate e-mail, the postscript file of the scientific and technical justification, to submit@vsop.isas.ac.jp

Information from the Cover Sheets of scheduled proposals will be made available from the VSOP WWW site.

Proposals must be received at ISAS by 1 February 2001