VSOP AO2 PROPOSAL COVER SHEETS

DEADLINE : 8 May, 1998
SEND TO : VSOG, ISAS, 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229-8510, JAPAN

(1) Date prepared : May 7, 1998

(2) Proposal title : Test of Magnetodynamic Jet Acceleration Mechanism

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(5) Proposal Abstract :

Acceleration mechanism of jets from active galactic nuclei (AGN) is one of the most important questions. Based on a magnetodynamic acceleration model proposed by Uchida and Shibata (1985), large scale magnetic field is twisted by an accretion disk to form helical magnetic field, and the helical field squeezes jets. We propose to observe this helical field structure in the jets of AGN by means of Faraday rotation (RM). As the sign of RM changes with the direction of line of sight component of the field, RM distribution is expected to be asymmetrical with respect to the jet axis. This observation requests high resolution to get tangential distribution of RM across the jet axis, while low frequency to detect Faraday rotation for possible small RM. Only VSOP fulfills these requirements, and we select some sources with strongly polarized jets (3C120, 3C273, 3C279, and 3C345) for the first step of such kind of observations. These observations should also reveal fine structure of the field.

(6) Proposal Category (indicate all that apply):
Object type:
☑ AGN, ☐ Maser, ☐ Stellar, ☐ Pulsar, ☐ Other :
Observation type:
☑ Continuum, ☐ Spectral Line, ☑ Polarization, ☐ Time-critical, ☐ 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 (10).

The number of experiments in this proposal is: 8

(8) Details of proposed experiments

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Source name (J*hhmm*±*ddmm*)	J0433+0521	J0433+0521	J1229+0203	J1229+0203
Alternative name	3C120	3C120	3C273	3C273
RA(J2000) (hh mm ss.ssss)	04 33 11.0955	04 33 11.0955	12 29 06.6997	12 29 06.6997
Dec(J2000) (dd mm ss.ssss)	+05 21 15.620	+05 21 15.620	+02 03 08.598	+02 03 08.598
Observing frequency band (GHz)	1.6	5	1.6	5
Continuum observations:				
Standard VSOP freq. channels?	☐	☑	☐	☑
Channel A range (MHz)	1600		1600	
Channel B range (MHz)	1730		1730	
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				
Correlator averaging time (sec)				
No. of correlating passes (if >1)				
Total flux density (Jy)	3.6-4.2	3.6-4.2	34.3-38.7	34.3-38.7
Correlated flux (mJy)	4000	4000	4000	4000
Ground Radio Telescopes:				
Suggested array given at Item (10)?	☑	☑	☑	☑
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 AO1 proposal code(s)				

	Experiment 5	Experiment 6	Experiment 7	Experiment 8
Source name (J*hhmm*±*ddmm*)	J1256-0547	J1256-0547	J1642+3948	J1642+3948
Alternative name	3C279	3C279	3C345	3C345
RA(J2000) (hh mm ss.ssss)	12 56 11.1665	12 56 11.1665	16 42 58.8099	16 42 58.8099
Dec(J2000) (dd mm ss.ssss)	-05 47 21.523	-05 47 21.523	+39 48 36.993	+39 48 36.993
Observing frequency band (GHz)	1.6	5	1.6	5
Continuum observations:				
Standard VSOP freq. channels?	☐	☑	☐	☑
Channel A range (MHz)	1600		1600	
Channel B range (MHz)	1730		1730	
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				
Correlator averaging time (sec)				
No. of correlating passes (if >1)				
Total flux density (Jy)	11.6-15.0	11.6-15.0	7.4-8.1	7.4-8.1
Correlated flux (mJy)	13000	13000	7600	7600
Ground Radio Telescopes:				
Suggested array given at Item (10)?	☑	☑	☑	☑
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 AO1 proposal code(s)				

(9) VSOP spacecraft observing mode (see Section 3 and Table 5 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 (10) below)

(10) Additional notes to the scheduler :

The aim of our investigation is needed accurate VLBI polarization, so we require VLBA. And in order to detect weakly polarized components, the phased VLA is necessary for our investigation. Here, we request VLBA and VLA.

(11) 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 229-8510 JAPAN

In addition, e-mail the completed LaTeX file 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 8 May 1998