# 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 8, 1998

**(2)** Proposal title : Polarization Monitoring of $\gamma$-ray Blazars at 5 & 1.6 GHz

| **(3)** | INVESTIGATORS | INSTITUTION |
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**(5)** Proposal Abstract :


We propose multi-epoch 5 and 1.6 GHz polarization-sensitive VSOP observations of three superluminal $\gamma$-ray blazars to further investigate the complex parsec-scale polarization structure we have been monitoring at higher frequencies (8,15,22,43 GHz) with the VLBA. These observations, with high resolution at lower frequencies, will characterize the sharp bends or oscillations in these sources over a larger range of scale than is possible from the ground at higher frequencies. Our ensemble of monitoring observations (including contemporaneous matched-resolution ground-based VLBI) will demonstrate the utility of polarization observations in unraveling complex and evolving jet trajectories. Possible helical structures will be investigated, and the refined shock model of Wardle et al. (1994, ApJ 437, 122) will be applied to constrain the relativisitic flow velocities and preferred orientations necessary to explain the gamma-ray emission.


**(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: 6

**(8)** Details of proposed experiments

| | Experiment 1 | Experiment 2 | Experiment 3 | Experiment 4 |
|---|---|---|---|---|
| Source name (J*hhmm*±*ddmm*) | J0237+2848 | J0237+2848 | J1613+3412 | J1613+3412 |
| Alternative name | 0234+285 | 0234+285 | 1611+343 | 1611+343 |
| RA(J2000) (hh mm ss.ssss) | 02 37 52.4057 | 02 37 52.4057 | 16 13 41.0643 | 16 13 41.0643 |
| Dec(J2000) (dd mm ss.ssss) | 28 48 08.9905 | 28 48 08.9905 | 34 12 47.9089 | 34 12 47.9089 |
| Observing frequency band (GHz) | 5 | 1.6 | 5 | 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) | | | | |
| 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 | 32 | 32 | 32 | 32 |
| Correlator averaging time (sec) | 2 | 2 | 2 | 2 |
| No. of correlating passes (if >1) | | | | |
| Total flux density (Jy) | 3.4 | 2.3 | 2.5 | 3.6 |
| Correlated flux (mJy) | 1500 | ∼1000 | 2500 | ∼1200 |
| *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 | 2 | 2 | 2 | 2 |
| Mean interval (days) | 200 | 200 | 100 | 100 |
| Related AO1 proposal code(s) | v093c | | | |

| | Experiment 5 | Experiment 6 | Experiment 7 | Experiment 8 |
|---|---|---|---|---|
| Source name (J*hhmm*±*ddmm*) | J1635+3808 | J1635+3808 | | |
| Alternative name | 1633+382 | 1633+382 | | |
| RA(J2000) (hh mm ss.ssss) | 16 35 15.4930 | 16 35 15.4930 | | |
| Dec(J2000) (dd mm ss.ssss) | 38 08 04.5005 | 38 08 04.5005 | | |
| Observing frequency band (GHz) | 5 | 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) | | | | |
| 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 | 32 | 32 | | |
| Correlator averaging time (sec) | 2 | 2 | | |
| No. of correlating passes (if >1) | | | | |
| Total flux density (Jy) | 3.2 | 2.7 | | |
| Correlated flux (mJy) | 500 | ~2000 | | |
| *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 | 2 | 2 | | |
| Mean interval (days) | 100 | 100 | | |
| Related AO1 proposal code(s) | v093a | | | |

**(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 :

-Suggested Ground Array: VLBA+phased-VLA+Effelsberg (maximize polarization sensitivity)
-Suggested epochs:
0234+285: Nov 1998, July 1999
1611+343: Jun 1999, August 1999
1633+382: Jun 1999, August 1999
-Please schedule 1.6 and 5 GHz separately but contemporaneously at each epoch.

-Tracking coverage gaps should be scheduled for polarization position-angle calibration by the ground array alone.

-The 1.6 GHz estimated correlated flux densities are from peak intensities in 2.3 GHz geodetic observations (USNO).

**(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**