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 : 10 November, 1995

(2) Proposal title : The Structure of Extremely High Redshift Quasars at 1.6 and 5 GHz

(3)	INVESTIGATORS	INSTITUTION
P.I.	L.I. Gurvits	JIVE, The Netherlands
co-I.	S. Frey	FÖMI SGO, Hungary
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co-I.	K.I. Kellermann, A.P. Lobanov	NRAO, USA
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co-I.	I.I.K. Pauliny-Toth	MPIfR, Germany
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(4) Principal Investigator (or contact person) details...

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(5) Proposal Abstract :

We propose to observe 13 extremely high redshift ($z > 3$) quasars at 1.6 GHz (total flux densities higher than 600 mJy) and 14 quasars at 5 GHz (total flux densities higher than 550 mJy). All of the proposed sources either have been or will be soon observed at 5 GHz with ground-based VLBI. These studies indicate that mas structures are dominated by bright features unresolved with ground-based VLBI. It makes these sources ideal targets for Space VLBI observations.
This proposal addresses two major scientific goals: (*i*) search for evolutionary effects in radio loud quasars as a class of objects and (*ii*) creation of an observational data base for cosmological application of parsec-scale radio structures in QSOs.
We suggest this proposal to be considered as a VSOP Key Science Program.

(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 :

(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 :

Recording mode :

☑ As for VSOP spacecraft (Standard), ☐ Other :

(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: 27

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Source name	1442+101	1442+101	1354−174	1354−174
RA (hh mm ss.s)	14 45 16.47	14 45 16.47	13 57 06.08	13 57 06.08
Dec (dd mm ss)	+09 58 36.1	+09 58 36.1	−17 44 01.8	−17 44 01.8
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	5	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)				
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)	2.6	1.24	1.4	1.01
Measured correlated flux density				
on > 5000 km baseline (Jy)	2.4	0.6	1.3	0.4
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	8	7	5	5
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	1	1	1	1
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	90	90	−10	−10
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☑	☑
Preferred range of dates for scheduling	98-04-01	98-04-01	98-03-15	98-03-15
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	98-05-31	98-05-31	98-04-30	98-04-30
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment 5	Experiment 6	Experiment 7	Experiment 8
Source name	0620+389	0620+389	0537−286	0537−286
RA (hh mm ss.s)	06 24 19.02	06 24 19.02	05 39 54.28	05 39 54.28
Dec (dd mm ss)	+38 56 48.7	+38 56 48.7	−28 39 55.9	−28 39 55.9
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	5	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)				
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)	0.8	0.81	0.8	1.23
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.7	0.5	0.7	0.7
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	8	7	5	7
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	1	1	1	1
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	40	40		
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☑	☑
Preferred range of dates for scheduling	98-01-01	98-01-01	97-02-15	97-02-15
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	98-02-15	98-02-15	97-04-15	97-04-15
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment 9	Experiment10	Experiment11	Experiment12
Source name	0642+449	0642+449	0014+813	1614+051
RA (hh mm ss.s)	06 46 32.03	06 46 32.03	00 17 08.47	16 16 37.56
Dec (dd mm ss)	+44 51 16.6	+44 51 16.6	+81 35 08.1	+04 59 32.7
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	5	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)				
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)	0.9	1.19	0.7	0.92
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.8	0.9	0.6	0.5
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	8	7	8	7
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	1	1	1	1
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	0	0	100	60
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☑	☑
Preferred range of dates for scheduling	97-02-01	97-02-01	98-03-01	98-04-01
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	97-03-31	97-03-31	98-04-30	98-05-31
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment13	Experiment14	Experiment15	Experiment16
Source name	1351−018	1351−018	0201+1120	1402+044
RA (hh mm ss.s)	13 54 06.90	13 54 06.90	02 03 46.66	14 05 01.12
Dec (dd mm ss)	−02 06 03.2	−02 06 03.2	+11 34 45.4	+04 15 35.8
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	5	1.6	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)				
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)	0.8	0.82	0.8	0.7
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.7	0.7	0.7	0.6
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	6	7	8	7
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	1	1	1	1
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	80	80		0
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☑	☑
Preferred range of dates for scheduling	98-05-01	98-05-01	97-08-01	98-04-01
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	98-05-31	98-05-31	97-08-31	98-05-31
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment17	Experiment18	Experiment19	Experiment20
Source name	0336−017	2215+020	1937−101	2000−330
RA (hh mm ss.s)	03 39 01.90	22 17 48.24	19 39 57.26	20 03 24.12
Dec (dd mm ss)	−01 33 19.0	+02 20 10.7	−10 02 41.5	−32 51 45.1
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	1.6	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)				
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)	0.6	0.8	0.8	1.03
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.5	0.7	0.7	0.6
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	7	7	6	6
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	1	2	2	2
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)	0			
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☐	☐	☐
Preferred range of dates for scheduling	97-02-01	97-06-01	98-04-01	98-05-01
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	97-03-31	97-07-31	98-05-31	98-05-31
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment21	Experiment22	Experiment23	Experiment24
Source name	2126−158	2126−158	1935−692	0201+1120
RA (hh mm ss.s)	21 29 12.18	21 29 12.18	19 40 25.53	02 03 46.66
Dec (dd mm ss)	−15 38 41.0	−15 38 41.0	−69 07 57.0	+11 34 45.4
J2000 or B1950?	J2000	J2000	J2000	J2000
Observing frequency band (GHz)	1.6	5	5	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)	0.6	1.19	1.02	0.75
Measured correlated flux density on > 5000 km baseline (Jy)	0.5	0.7	0.6	0.3
Image RMS needed (mJy/beam)	0.2	0.2	0.2	0.2
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	6	6	4	8
Number of large telescopes	2	2	2	2
Suggested array given at Item (14)	☐	☐	☑	☐
Minimum acceptable:				
Number of medium telescopes	4	4	3	4
Number of large telescopes	1	1	1	1
Suggested array given at Item (14)	☐	☐	☑	☐
Length of observation:				
Preferred length (orbits)	3	3	3	3
Minimum acceptable length (orbits)	2	2	2	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)	97-06-01 to 97-07-31	97-06-01 to 97-07-31	97-08-01 to 97-09-30	97-08-01 to 97-08-31
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

	Experiment25	Experiment26	Experiment27	Experiment28
Source name	1937−101	1402+044	0014+813	
RA (hh mm ss.s)	19 39 57.26	14 05 01.12	00 17 08.47	
Dec (dd mm ss)	−10 02 41.5	+04 15 35.8	+81 35 08.1	
J2000 or B1950?	J2000	J2000	J2000	
Observing frequency band (GHz)	5	5	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)	0.75	0.71	0.55	
Measured correlated flux density				
on > 5000 km baseline (Jy)	0.3	0.3	0.2	
Image RMS needed (mJy/beam)	0.2	0.2	0.2	
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	6	7	8	
Number of large telescopes	2	2	2	
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	4	4	4	
Number of large telescopes	1	1	1	
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	3	3	3	
Minimum acceptable length (orbits)	1	1	1	
Scheduling constraints:				
Preferred P.A. of beam *major* axis (deg)		0	100	
'No holes' (u,v) coverage?	☐	☐	☐	☐
Or maximum resolution (u,v) coverage?	☑	☑	☑	☐
Preferred range of dates for scheduling	98-04-01	98-04-01	98-03-01	
(for monitoring experiments give	to	to	to	to
range for 1st observation only)	98-05-31	98-05-31	98-04-30	
For monitoring programs:				
Number of observations				
Mean interval (days)				
Acceptable variance from mean (days)				

(14) Additional notes to the scheduler :

Correlated flux densities given are estimates based on the formulas in the Proposer's Guide (except for experiments 4, 10, 12 and 14).
'Maximum resolution' uv-coverage selected only in those cases when simulations showed it feasible.

11 sources are proposed for both 1.6 and 5 GHz observations.

Suggested ground array for the Exp. 23: Narrabri, Parkes, Hartebeesthoek, Hobart, Mopra and Ceduna (if available).

(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