European Organisation for Astronomical Research in the Southern Hemisphere

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APPLICATION FOR OBSERVING TIME

PERIOD: **96A**

Important Notice: **ToO**

By submitting this proposal, the PI takes full responsibility for the content of the proposal, in particular with regard to the names of CoIs and the agreement to act according to the ESO policy and regulations, should observing time be granted.

1. Title

Category: **A–4**

Hubble Frontier Field Supernova Spectroscopy

2. Abstract / Total Time Requested

Total Amount of Time:

The HST Frontier Fields (HFF) program presents an extraordinary opportunity for the detection of high redshift supernovae (SNe) out to $z \sim 3$. We propose to capitalize on this unique asset by searching the HFF data and triggering ToO follow-up for SNe of interest. We expect to discover ~ 50 new SNe over the entire 3-year program, including ~ 5 SNe Ia at $z > 1.5$ and ~ 10 SNe Ia at $z > 0.5$ with strong lensing magnification. During the first 1 year of the HFF program we have discovered 21 new SNe. These samples are small but special: the high-z SN Ia set has unique leverage for testing SN Ia progenitor models through the delay time distribution while the lensed SNe Ia offer a chance to validate cluster mass models by directly measuring the lensing magnification. We will also be able to extend core-collapse SN rate measurements for the first time beyond $z \sim 1$. This follow-up program provides the spectroscopic information necessary to unlock the science potential of these SNe.

3.

Run	Period	Instrument	Time	Month	Moon	Seeing	Sky	Mode	Type
A	96	XSHOOTER	6.4h	any	n	1.0	THN	s	TOO

4. Number of nights/hours

	Telescope(s)	Amount of time
a) already awarded to this project:	VLT	20.2h awarded in P92–P93.
b) still required to complete this project:	UT2	$\sim$ 15 h in total (P96–P97)

5. Special remarks:

This proposal is part of a larger collaborative effort, involving a dedicated 40-orbit HST program (PID 13386, PID 13790, PI Rodney) to improve the characterisation of candidate SNe discovered in the Hubble Frontier Fields. Some of the spectroscopy could possibly be obtained in 'normal' service mode (see Box 8b).

6. Principal Investigator: JHJORTH

6a. Co-investigators:

S.	Rodney	1698
J.	Selsing	1227
L.	Christensen	1227

7. Description of the proposed programme

A – Scientific Rationale: Scientific rationale: scientific background of the project, pertinent references; previous work plus justification for present proposal.

B – Immediate Objective: Immediate objective of the proposal: state what is actually going to be observed and what shall be extracted from the observations, so that the feasibility becomes clear. In the case of VLT-XMM programmes please also specify the immediate objectives of the XMM observations.

7. Description of the proposed programme and attachments

Fig. 1: A caption for your figure can be inserted here.

References can also be included using MakeCaption. For example:
References:

8. Justification of requested observing time and observing conditions

Lunar Phase Justification: Provide here a careful justification of the requested lunar phase.

Time Justification: (including seeing overhead) Provide a careful justification of the requested number of nights or hours for each observing run here. ESO Exposure Time Calculators exist for all Paranal and La Silla instruments and are available at the following web address:
http://www.eso.org/observing/etc .
Links to exposure time calculators for APEX instrumentation can be found in Section 7 of the Call for Proposals.

8a. Telescope Justification:

Justification for the use of the selected telescope (e.g., VLT, APEX, etc...) with respect to other available alternatives.

8b. Observing Mode Justification (visitor or service):

Explain if a particular observing mode is specifically needed for this programme. If either can, in principle, be used then please enter N/A.

8c. Calibration Request:

Special Calibration - Adopt a special calibration

9. Report on the use of ESO facilities during the last 2 years

This macro is optional and can be commented out.

9a. ESO Archive - Are the data requested by this proposal in the ESO Archive (http://archive.eso.org)? If so, explain the need for new data.

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9b. GTO/Public Survey Duplications:

Specify whether there is any duplication of targets/regions covered by ongoing GTO and/or Public Survey programmes. If so, please explain the need for the new data here. Details on the protected target/fields in these ongoing programmes can be found at:
GTO programmes: http://www.eso.org/sci/observing/teles-alloc/gto.html
Public Survey programmes: http://www.eso.org/sci/observing/PublicSurveys/sciencePublicSurveys.html
This macro is optional and can be commented out.

10. Applicant's publications related to the subject of this application during the last 2 years

Name1 A., Name2 B., 2001, ApJ, 518, 567: Title of article1

Name3 A., Name4 B., 2002, A&A, 388, 17: Title of article2

Name5 A. et al., 2002, AJ, 118, 1567: Title of article3

11. List of targets proposed in this programme

Run	Target/Field	α(J2000)	δ(J2000)	ToT	Mag.	Diam.	Additional info	Reference star
A	SN1	00 00 00.0	+00 00 00	3.2	J=23	1”		
A	SN2	00 00 00.0	+00 00 00	3.2	J=23	1”		

Target Notes: A note about the targets and/or strategy of selecting the targets during the run. For APEX runs please remember to specify the PWV limits for each target under 'Additional info' in the table above.

12. Scheduling requirements

This proposal involves time-critical observations, or observations to be performed at specific time intervals.

12. Scheduling requirements contd...

4. Specific date(s) for time critical observations:

Run	from	to	reason
A	12-nov-15	14-nov-15	Insert reason for time-critical observations.

13. Instrument configuration

Period	Instrument	Run ID	Parameter	Value or list
96	XSHOOTER	A	300-2500nm	SLT
96	XSHOOTER	A	SLT	1.0, 0.9, 0.9JH
96	XSHOOTER	A	SLT	100k-1x1,100k-1x1,NDR

14. List of ToO runs proposed in this programme

Run	Nature	Targets per run	Triggers per target
A	ToO-soft	2	2