IRAM **300, rue de la Piscine**
38406 ST. MARTIN d'HERES (France)
Fax: (33/0) 476 42 54 69

For IRAM use

Registration N°:

Date:

PROPOSAL FOR 30M TELESCOPE

Deadline: 18 Mar 2010 Period: 01 Jun 2010 — 30 Nov 2010

TITLE **Constraining the Cold Gas Mass in RBS 797, One of the Most Powerful AGN Outbursts**

Type: *Solar system:* continuum◯ lines◯ other◯ *Extragalactic:* continuum◯ CO lines● other◯
Galactic: continuum◯ lines◯ circumstel. env.◯ young stel. obj.◯ cloud struct.◯ chem.◯ other◯

ABSTRACT
A maximum of nine lines is reserved for the abstract.

Is this a resubmission of a previous proposal ? no● yes◯ – proposal number(s): .....
Is this a continuation of (a) previous proposal(s) ? no● yes◯ – proposal number(s): .....

Hours requested for this period

Total [XX] EMIR [XX] HERA [ ] MAMBO [ ]

LST range(s) and number of intervals

from: to: intervals:
from: to: intervals:

Special requirements: Large Program◯ pooled obs◯ service obs◯ remote obs● polarimeter◯

Scheduling constraints: None

Receivers: EMIR● HERA◯ MAMBO◯ Other◯

List of Objects (give most common names)

Source	Epoch: J2000.0 RA	DEC	V_{LSR} or z
RBS 797	09:47:12.5	+76:23:12	0.354

(for additional sources which do not fit here use the `\extendedsourcelist` macro)

Principal Investigator:

Kenneth Cavagnolo
University of Waterloo; Dept. of Physics & Astronomy
200 University Avenue West
Waterloo, Ontario, Canada N2L 3G1 (CANADA)
Tel: (+001) 519888456735074 Fax: (+001) 5197468115
Email: kcavagno@uwaterloo.ca

Other Investigators (name, institution):

Myriam Gitti (INAF-OAB – Italy); Brian McNamara (University of Waterloo – Canada); Paul Nulsen (Harvard-Smithsonian Center for Astrophysics – U.S.A.); David Rafferty (Leiden Observatory – Netherlands); Michael Wise (University of Amsterdam – Netherlands);

Expected observer(s) Cavagnolo

join to this form: scientific aims ≤ 2 typed pages (≤ 4 pages for Large Programs) and ≤ 2 pages Figs., Tabs., and Refs.

Technical Summary

Variables used: T_A^* expected line antenna temperature; T requested telescope time per setup; Δv required velocity resolution; pwv precipitable water vapor: 1, 2, 4, 7, or 10 mm.

⋆ EMIR

Note that up to 4 IF signals can be recorded and up to 2 EMIR (always dual polarization) bands can be combined in one EMIR setup. For a summary of EMIR connectivity consult the IRAM Granada home page or the Call for Proposals

Transitions

setup	band	species	transition	frequency GHz	T_A^* mK	rms mK	Δv km s^{-1}	backend [a])
1	E0	CO	1-0	85.1	143.2	XX	100.0	W
1	E1	CO	2-1	170.2	311.1	XX	100.0	W
2	E2	CO	3-2	255.3	370.4	XX	100.0	W

[a]) V: VESPA, W: WILMA, 4: 4 MHz filterbank, 1: 1 MHZ filterbank

Observing parameters

map size in arcmin

setup No.	map size $\Delta x \times \Delta y$	mapping mode [a])	switching mode [b])	pwv mm	T hours	remark
1	×	none	PSw	7	X	Dual-band observation with E1
1	×	none	PSw	7	X	Dual-band observation with E0
2	×	none	PSw	7	X	Single-band observation
Total EMIR time requested:					XX	

[a]) none, OTF (on–the–fly), R: Raster

[b]) PSw: position switching, FSw: frequency switching, Wsw: wobbler sw.

Constraining the Cold Gas Mass in RBS 797, One of the Most Powerful AGN Outbursts

My proposal.

References

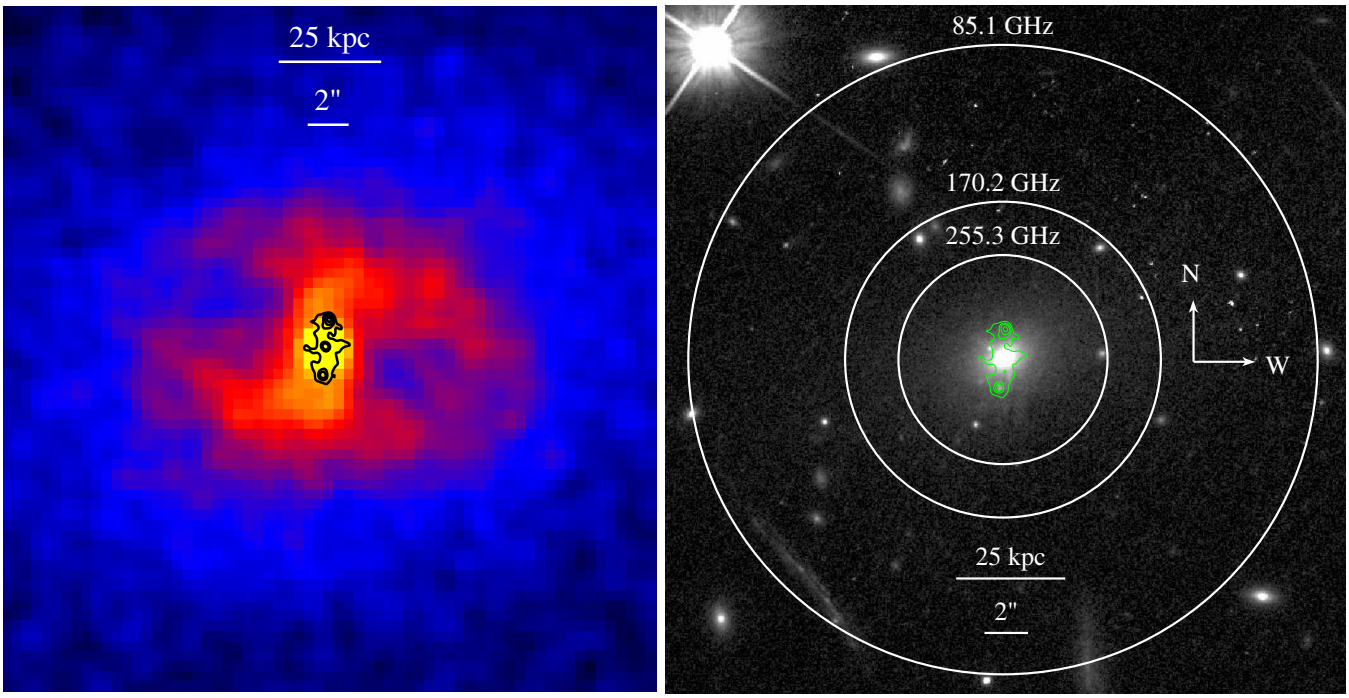

Figure 1:

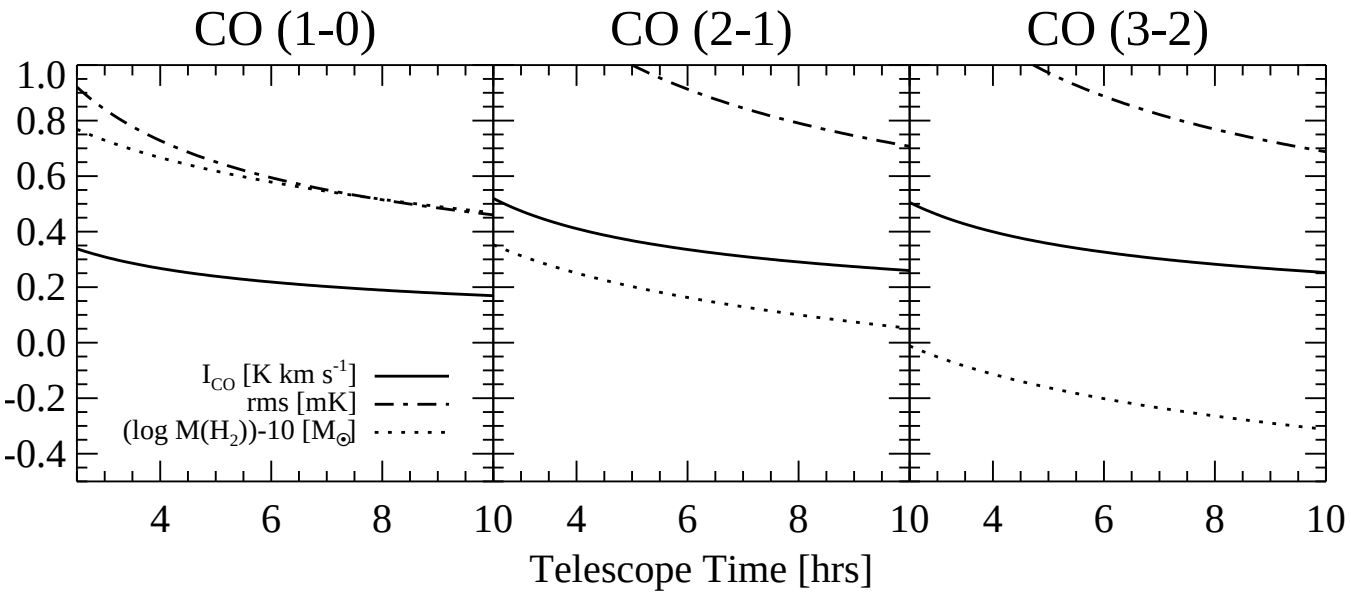

Figure 2: EMIR CO line intensity, rms noise, and H_2 mass as a function of position switched observing time. Solid lines are I_{CO} 3σ upper limits; dashed-dot lines are T_{rms} specific to elevation & ν_{obs}; dashed lines are M(H_2) 3σ upper limits; downward arrows are 3σ M(H_2) upper limits from Evans et al. 1998 (adjusted to our cosmology and I_{CO}:M(H_2) assumptions). The CO(1-0) and CO(2-1) calculations include the 16K and 6K T_{sys} increases, respectively, from use of the E0/E1 dichroic. All calculations assumed: 7 mm of precipitable water vapor, $\Delta v_{res} = 50$ km s^{-1}, $v^{CO}_{FWHM} = 300$ km s^{-1}, and backend efficiency of 0.87.