

# RadioNet support for scientific events

## Application form for organisers

EVENT INFORMATION	
TITLE	A workshop to investigate the enigma of the virial parameter
PLACE	Haystack Observatory, Massachusetts Institute of Technology, 99 Millstone Road, Westford, MA 01886, USA.
ORGANISER'S INSTITUTE NAME	INAF-IAPS, Via Fosso del Cavaliere, 100. 00133 Rome, Italy. Alessio Traficante alessio.traficante@iaps.inaf.it
DATE	March 2019
NO. OF PARTICIPANTS	3 (Alessio Traficante; Jens Kauffmann; Thushara Pillai)
TOTAL EVENT COST	2000 euros
RADIONET SUPPORT	2000 euros
OTHER SOURCES OF FUNDING	No other sources of funding
REQUEST	
<i>(max. 2 pages)</i>	
Short abstract of the event	<p>The aim of this 1-week small workshop is the analysis and investigation of the newest 3mm data obtained at the IRAM 30m telescope under the project 040-18 (PI: Alessio Traficante), which aim to investigate one of the open problems in the context of the massive star formation: to understand if the ratio between the kinetic and the gravitational energy in massive star-forming regions, described by the virial parameter, is a good indicator of the dynamics of these regions. A crucial observable required to determine the kinetic energy of a system is the gas velocity dispersion, which has always been determined with the use of a single dense gas tracer like e.g. N<sub>2</sub>H<sup>+</sup> (1-0) or NH<sub>3</sub> (1-1).</p> <p>This approach however may lead to a biased estimation of the virial parameter. In massive regions, the use of a single gas tracer may either loose the kinetic signatures of the low-density gas, if a high-density gas tracer as N<sub>2</sub>H<sup>+</sup> (1-0) is used, or include kinematic signatures from surrounding regions, if a low-density gas tracers as NH<sub>3</sub> (1-1) is used.</p> <p>With the 040-18 project we proposed an innovative approach in which we explore the capabilities of an optically thin line, OCS (7-6), almost unexplored in the literature, to trace the kinematics of the low-density gas localized within the star-forming regions, without the contamination from the surroundings. The gas kinematics traced by OCS, compared with the kinematics traced by N<sub>2</sub>H<sup>+</sup> (1-0) within the same regions, will allow us 1) to learn the capabilities of the OCS line to trace the kinematics in massive regions and 2) to investigate with unprecedented details if the gas velocity dispersion estimated with a single gas tracer gives rise to a biased estimation of the kinetic energy of the explored regions.</p> <p>This workshop is necessary to combine the expertise of the participants, which are the PI and Co-Is of the project and all experts of IRAM 30m data. The first aim of the</p>

	workshop is to reduce and interpret this new dataset. The final goal is to draw the first conclusions about the scientific questions raised in the project.
Relevance for RadioNet	This workshop will permit the direct collaboration between PI and Co-Is of our IRAM 30m project. The scientific questions raised in the project require a deep knowledge of both the far-infrared data acquired with Herschel and the 3mm data acquired with the IRAM 30m facilities. The expertise of the participants at these wavelengths is well demonstrated by the scientific publications. This workshop will guarantee a scientific exploitation of these datasets and a first answer to a crucial question in the context of the massive star formation.
Impact on RadioNet	The results of this workshop will confirm the importance of combining far-infrared and mm datasets in order to answer key scientific questions in the context of the star formation. The results of this workshop will be presented in international conferences and we also aim to start from these results to request a large-program that will fully answer the questions addressed in the workshop.
Use of the RadioNet contribution	<p>The workshop will be held in Boston, where 2/3 of the participants are located. This will reduce the expenses of the workshop, as only the PI of the project (Alessio Traficante) will travel.</p> <p>The estimated total cost for this 1-week workshop is 2000 euros. The cost of the Rome-Boston flight is estimated in ~1000 euros. The expenses for lodging, meal and travels in Boston are estimated in ~1000 euros in total for the whole week. The workshop will be held in the conference Room D of the Haystack Observatory, Massachusetts Institute of Technology, which is organized in loco by Jens Kauffmann at no expenses.</p>
Ethics	There are no ethics issues in this workshop.
<p><b>Privacy Policy:</b> With signing this template and applying for RadioNet funding, I accept the <u>Privacy Policy of RadioNet</u>, which is based on the EU General Data Protection Regulation (GDPR).</p>	
Place & Date:	Signature of the applicant:
Rome, 28/06/2018	