Location of Appointment : Observatoire de Paris

Team Leader (contact person) : Prof E. Roueff

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Various URL : http://luth2.obspm.fr/, http://aristote.obspm.fr/MIS/, http://www.ias.u-psud.fr

Category of position : Early Stage Researcher

Duration of Appointment : 36 months

Expected starting date : 15th of September 2005

Requirements with respect to candidate : physics, chemistry or astronomy degree

Title of Research Project : **Gas phase and icy H_2O in photon-dominated regions**

An opportunity exists to study for a Ph.D. degree at the Observatory of Paris (under the direction of Prof. J. Le Bourlot, , LUTH and UMR 8102 du CNRS, Observatoire de PARIS, Section de Meudon, Place J. Janssen, F-92190 MEUDON, France (e-mail: jacques.lebourlot@obspm.fr)), with secondment at the Institut d'Astrophysique Spatiale, Orsay, France (in the team of Prof. F. Boulanger, Institut d'Astrophysique Spatiale, Bat. 121, Universite Paris 11, 91405 Orsay cedex (e-mail: francois.boulanger@ias.fr).).

General introduction

Molecular water is ubiquitous in the universe and is present both in the gas phase and on dust grains as the main constituent of molecular ices. The HIFI instrument on board of the Herschel satellite will provide the first extensive opportunity to study this basic molecule in the gas phase whereas ISO, followed by SPITZER, bring information on the infra red features resulting from ices. On the molecular physics side, spectroscopic and dynamical studies of water is an active field of research and a central topic of the FP6 "Molecular Universe" program. The present proposition aims to gather the various knowledge obtained on this molecule and include them as accurately as possible in chemical interstellar models. Comparison with forthcoming observations is expected.

Methods

This graduate project will combine a physical model of a PDR region with a chemical kinetic model of

water formation and destruction. As well as investigating the gas-phase formation of water and its contribution to the cooling, the project will also include the role of grains. Ice chemistry and desorption processes will be included in the gas phase model built in the Meudon team (cf. http://aristote.obspm.fr/MIS/) which will be modified to include advection of matter from the shielded interior of molecular clouds to their warmer surfaces penetrated by UV photons. These modifications will enable us to investigate the impact of ice desorption on gas chemistry, in particular water abundance and oxygen containing species. The evolution of the grains themselves will be considered. Some contribution to the FP6 Paris Observatory Data base project is expected.

Application

The position is available from September 15th 2005. Letters of application for this position should be sent **by June 15**, **2005** to the address above.

The application should include a curriculum vitae together with a detailed list of university courses taken and their grades, as well as a brief statement of research experience. The applicant should arrange for two letters of recommendation by persons familiar with his/her undergraduate studies and/or research to be sent to the same address by the deadline. Qualified women candidates are specifically encouraged to apply.

Information on the PDR code of the Observatoire de Paris-Meudon team can be found at http://aristote.obspm.fr/MIS/

All applicants should be aware of the nationality and age constraints associated with this position.