

Collisional excitation rates in the ISM

M.L. Dubernet¹

¹LERMA, UMR CNRS 8812, Paris Observatory, 5 Place Janssen, 92195 Meudon, France
email: marie-lise.dubernet@obspm.fr

Abstract. Over the next few years, ground-based and space-based missions will open up the universe to high spatial and spectral resolution studies at infrared and submillimeter wavelengths. This will allow to study, in much greater detail, the composition and the origin and evolution of molecules in space. These new missions can be expected to lead to the detection of many thousands of new spectral features. Identification, analysis and interpretation of these features in terms of the physical and chemical characteristics of the astronomical sources will require detailed astronomical tools supported by laboratory measurements and theoretical studies of chemical reactions and of collisional excitation rates on species of astrophysical relevance. The talk will focus on collisional excitation rates, discussing currently available data (BASECOL database, Schöier *et al.* (2005)), presenting new work currently being carried out by various teams (e.g. Daniel *et al.* (2004), Faure *et al.* (2005), Daniel *et al.* (2005), Lique *et al.* (2005)) and outlining various interesting problems that still need to be tackled in order to provide answers to astrophysical questions.

Keywords. ISM: molecules, molecular processes

References

- BASECOL database [<http://amdpo.obspm.fr/basecol>]
Schöier, F.L., van der Tak, F.F.S., van Dishoeck, E.F., Black, J.H. 2005 *A. & A.* 432, 369
Daniel, F., Dubernet, M.-L., Meuwly, M. 2004, *J. Chem. Phys.* 121, 4540
Faure, A., Valiron, P., Wernli, M., Wiesenfeld, L., Rist, C., Noga, J., Tennyson, J. 2005, *J. Chem. Phys.*, AIP ID: 301523JCP Issue: 15 Jun 2005, Section: 11 – Communications
Daniel, F., Dubernet, M.-L., Meuwly, M., Cernicharo, J., Pagani, L. 2005, submitted to *MNRAS*
Lique, F., Spielfiedel, A., Dubernet, M.-L., Feautrier, N. 2005, submitted to *J. Chem. Phys.*