

Abstract Submitted  
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**Prospects for sympathetic cooling of optically stark decelerated molecules** PAOLO BARLETTA, JONATHAN TENNYSON, PETER F. BARKER, University College London — A novel approach has recently been proposed for producing ultra-cold molecules by sympathetic cooling with optically co-trapped rare gas (Rg) atoms [1]. For an efficient planning and realization of the experiment theoretical determination of atom-molecule cross sections at ultra-low energies is very important. In this contribution I will present calculations of scattering lengths and cross sections for the Rg-H<sub>2</sub> and Rg-benzene complexes (Rg=He,Ne,Ar,Kr,Xe), with particular emphasis on Ar and Kr. H<sub>2</sub> and benzene are considered in their lowest vibrational-rotational states. A direct Monte Carlo simulation of the dynamics of the cooling process has been made by means of the Bird method. This simulation will enable the optimization of the experimental apparatus, and to test the cooling capability of the different Rg gases. [1] P. Barletta, J. Tennyson, P.F. Barker, *Phys. Rev. A*, **78**, 052707 (2008).

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