CFEL SCIENCE

# SEMINAR

**30th June 2016 - 10:00 h**

CFEL – Building 99, seminar room I+II (ground floor)


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## The stereodynamics of inelastic scattering of NO(X) by the rare gases

This talk will present new experimental results on the inelastic scattering of NO(X) by Ar, and other rare gases, in which the NO(X) molecule is fully quantum state-selected both before and after collision. State-to-state differential cross-sections (DCSs) and collision-induced angular momentum polarizations observed following the fully Λ-doublet resolved inelastic scattering of $NO(X^2\Pi_{1/2},v=0,j=1/2,f)$ with the rare gases will be presented, and compared with the results state-of-the-art theoretical calculations.

The dependence of the DCSs and angular momentum polarization on rotational and Λ-doublet state will be discussed, with reference to simple classical and semi-classical models, as well as to exact quantum scattering calculations.

New experimental results will also be presented in which it has been possible to measure the DCSs and polarization of the inelastically scattered NO(X) products arising from collisions with oriented NO molecules [1,2]. These results may be considered the first angular scattering resolved measurements of the stereodynamics of inelastic scattering of NO(X) by the rare gases, obtained with full quantum state resolution. A particular focus of the talk will be a discussion of the quantum mechanical origin of the steric effect and of collision induced angular momentum orientation.

References


[1] A new perspective: imaging the stereochemistry of molecular collisions, F.J. Aoiz, M. Brouard, S.D.S. Gordon, B. Nichols, S. Stolte and V. Walpole, Phys. Chem. Chem. Phys. 17, 30210 (2015)

[2] Steric effects and quantum interference in the inelastic scattering of NO(X) + Ar, B. Nichols, H. Chadwick, S.D.S. Gordon, C.J. Eyles, B. Hornung, M. Brouard, M.H. Alexander, F.J. Aoiz, A. Gijsbertsen and S. Stolte, Chemical Science 6, 2202, (2015)


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