

Report on the STSM of N. Stolterfoht at the ATOMKI Institute from December 12 to 17, 2004 within COST P9 Action

The laboratories in Berlin and Debrecen have an ongoing collaboration since about 3 years concerning the fragmentation of molecules by impact of slow highly charged ions. Experiments were started studying the fragmentation of water molecules because of its relevance to biological matter. The experiments we performed at the Electron Cyclotron Resonance (ECR) accelerator facility in Berlin where the energy and angular distribution of fragment ions from collisions of 1 – 20 keV He^+ and He^{2+} ions with H_2O molecules were measured. The results have been put together with those of other laboratories in Belfast and Groningen within the Cost P9 Action and a common Paper has been accepted to Physical Review A.

Within Cost 09 Action we will have started future work using different projectiles with charge states and projectile energies varied in a wide range. In this STSM experiments with the fast helium ions have been prepared. The instrument used in Berlin to produce water vapour jet stream in vacuum was taken as the basis to construct a similar device in Debrecen. Previous results from Berlin have interpreted within the framework of a Coulomb explosion model. Strong anisotropies in the angular distribution of recoil fragments are attributed to alignment effects caused by the slow incident ion. The Coulomb explosion has been further developed. In addition, the Demkov Model has been applied to describe single-electron processes underlying the molecular fragmentation. In binary quasi collisions a new approach using scattering potentials with appropriate screening has successfully been explored. A publication about the aspect of binary collisions is in preparation.

HMI Berlin, December 20, 2004

(N. Stolterfoht)

I agree with this Report of the STSM in Debrecen by Nikolaus Stolterfoht

ATOMKI Debrecen, December 22, 2004

(B. Sulik)