

**Report on the STSM of N. Stolterfoht at the ATOMKI Institute  
from May 7 to 13, 2005 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 multiply charged ions. The experiments were started to study systematically the fragmentation of water molecules because of its relevance to biological matter. Recently, experiments performed with 1-5 keV  $\text{He}^{2+}$  impact at the Electron Cyclotron Resonance (ECR) accelerator facility in Berlin, were combined 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.

In this STSM experiments with fast helium ions were performed using instruments that have been prepared during the previous STSM. 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. The measurements yielded new results for fragmentation of  $\text{H}_2\text{O}$  and  $\text{CH}_4$ . It was found that the spectra of fragmented  $\text{H}^+$  from  $\text{H}_2\text{O}$  and  $\text{CH}_4$  for energies up to 30 eV are quite different showing that the Coulomb explosion mechanism essentially differs for the 2 target species. We started to work on the theoretical interpretations of the observed phenomena.

In addition to the experiments we worked on the publication concerning our previous work in Berlin. Ions from  $\text{H}_2\text{O}$  fragmented in binary collisions were compared with predictions of model calculations based on the Biersack-Ziegler-Littmark (ZBL) potential. The good agreement between experiment and theory provides confidence that absolute cross sections for fragmentation by ion impact can be determined with relatively high precision.

HMI Berlin, May 20, 2005

(N. Stolterfoht)

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

ATOMKI Debrecen, May 25, 2005

(B. Sulik)