COST P9 short term scientific mission – report

Name : Gabriel Hasan
Period : (1/9/2004 – 2/10/2004)
Host : Thomas Schlathölter, KVI Groningen, Netherlands

The stay in Groningen began with the installation of a new oven system to evaporate small biomolecules. The new oven allows quick and easy replacement of the bio-molcular sample.
An ongoing project at the KVI focuses on the response of the nucleotide thymidine upon singly and multiply charged ion impact. Studies on thymine, a building block of thymidine, had been successfully completed before and a variety of fragmentation channels had been identified by means of coincidence time of flight spectrometry.
For September 2004, experiments on thymidine were planned. The temperature at which thymidine can be evaporated without any thermal fragmentation had been determined in Innsbruck to be 398 K. It turned out that at this temperature the vapour pressure of thymidine is too low to deliver a sufficient signal for the installed oven. For thymine and uracil, a 0.5 mm nozzle had been successfully employed.
For thymidine and He^{2+} impact, the oven output was so low that the obtained time of flight spectrum was dominated by residual gas contributions (H_2O, CO, CO_2). The higher masses, attributed to thymidine fragments, showed some similarities to the electron impact induced reference mass spectrum obtained from the NIST databases. However, we did not observe a strong contribution of the parent ion (mass 242) but rather small peaks at even larger masses, probably due to thymidine-water complexes.
Presently, the oven system is optimised for the low vapour pressure molecule thymidine, i.e. the nozzle diameter was increases and the distance between nozzle and collision region has been decreases.
In the meantime, the coincidence system has been successfully tested with the newly installed reflectron time of flight spectrometer. First experiments using the improved oven system are planned for early October.
I am furthermore convinced that my visit will lead to a fruitful collaboration with the Groningen group in the future.