

## Scientific Report

The main object of the short term scientific mission was to become familiar with the new apparatus under construction at Aarhus for low energy electron scattering in solid material, and to design a new electron source. This source can be used independently of the ASTRID synchrotron source for working “off-line” (this is when we do not have beam-time). During this stay I was able to see and get known all the parts of the experiment. I also assisted in the phase of putting it together. This involved UHV vacuum technology, surface science techniques etc. which overlap with my expertise but which are partly new to me.

The decision was to construct the new electron source and as I was working previously with electron beam sources I used my knowledge in this area to design a suitable source. I performed an extensive simulation of this electron source and its connection to the experimental set-up. The device is a trochoidal electron monochromator. We also investigated different possibilities of transport of the produced electrons from the new source to the collision region of the original setup. Thus involved the design of a three element lens, introducing me to new areas of electron optics.

Another purpose of the visit was data analysis of the results, obtained during my visit in Aarhus in February 2004. We went carefully through the measured data, electron scattering to methyl bromide ( $\text{CH}_3\text{Br}$ ), as shown in Figure 1, and started analysis of the data using the Born approximation.

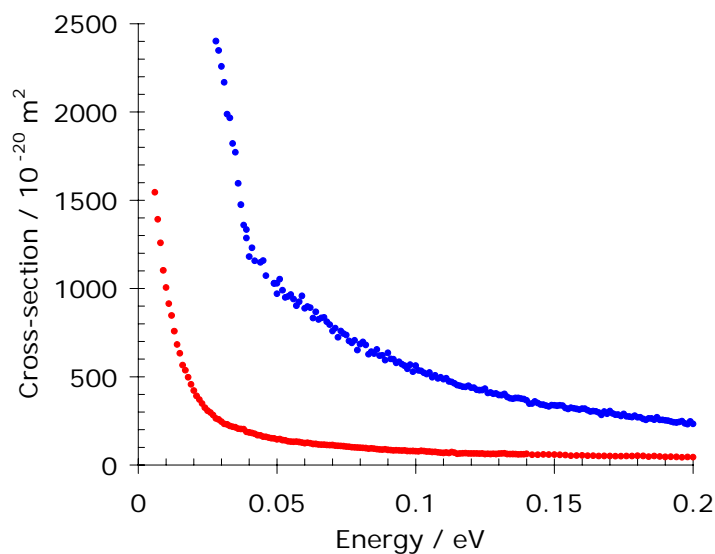


Figure 1 Cross section for electron scattering to  $\text{CH}_3\text{Br}$ .

During this time Roman Curik was also visiting Aarhus (under the EU EPIC network) and was involved in the theoretical side of the analysis. We worked closely with him to discuss the various aspects of the data representation. The analysis is work in progress and will be published.

The work done during my STSM visit in Aarhus is beginning of the work in which I will be involved in the future. We will be laying down films of DNA bases, deoxyribose etc. and using DNA itself. Experiments will also be performed on transmission of cold electrons through  $\text{CF}_4$  and some other gases, which also contain very interesting science and are important for the atmospheric chemistry.