Contribution ID: **77** Type: **poster**

Development of a Remote-Controlled UV-VIS Spectrometer for fluorescence measurements at Heavy-Ion Storage Rings

Monday, 19 September 2016 18:00 (2 hours)

The collision of highly charged, heavy ions with atomic or molecular gas targets or free electrons causes a variety of reactions such as electronic excitation, ionization, radiative electron capture and, in the case of molecules, dissociation. After such a highly energetic reaction, these targets remain in superexcited electronic states which themselves may decay via fluorescence, autoionization into radiative states or dissociation into excited fragments. Typically, these processes are followed by the emission of one or more fluorescence photons in the spectral range from visible light (VIS) to vacuum-ultraviolet radiation (VUV).
A Seya-Namioka type spectrometer for the dispersion and detection of this fluorescence in the wavelength range between 35 nm and 180 nm for experiments at gas- and electron targets and electron coolers at the FAIR facility will be set up. The benefit of using a fluorescence spectrometer is the inherent sensitivity of this technique to the charge and electronic states of the target atoms and molecules. Processes to be investigated will be radiative electron capture and dielectronic recombination.
In a preliminary measurement, an already existing spectrometer has been used that does not meet the vacuum conditions and was separated by a window, restricting the detectable wavelengths to the visible and near-UV spectral range, however fluorescence spectra from a Xenon gas target, excited with Xe54+ with 50MeV/u could be obtained.
During this experiment, the need for a complete remote control of the spectrometer in terms of position adjustment in three dimensions, rotation of the optical grating and the entrance slit turned out to be a requirement for future experiments. A remote-controllable support for the spectrometer has been developed and tested at the ESR Gas Target during operation.

Collaboration

SPARC

Primary author: REIß, Philipp (University of Kassel)

Co-authors: Dr KNIE, André (University of Kassel); Prof. EHRESMANN, Arno (University of Kassel)

Presenter: REIß, Philipp (University of Kassel)

Session Classification: Poster Session and Coffee