

Investigation of light phenomena observed during interaction of highly charged ions with a liquid droplet beam target

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High density low-Z droplet target beams have been realized at the Experimental Storage Ring (ESR) since many years. In the course of the past beamtimes the droplet target source underwent a thorough characterization. However, a puzzling observation was made in the course of the optical imaging of the interaction region. Occasionally, bright light traces appeared on the pictures exhibiting a much higher photon intensity than the light emitted from the interaction region.

Unfortunately, no systematic measurements could be performed in order to further investigate in detail these unexpected observations. The main reason was the absence of fast detection techniques in order to correlate the emergence of the light traces with secondary detector devices, e.g. particle detectors.

Besides the very interesting question on the origin of these observations, their understanding is of utmost importance since the new droplet target source is foreseen to be applied at all FAIR storage rings. Furthermore, the interaction of stored highly charged ions with micrometer-sized droplets has never been investigated before and thus the proposed investigations could open up a new research field for storage rings.

The aim of the proposed experiment is the systematic investigation of the light traces in time correlation with charged particles emitted from the target interaction region.

Primary author: PETRIDIS, Nikolaos (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI))

Presenter: PETRIDIS, Nikolaos (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI))

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