Contribution ID: 8

Orbital electron capture decay of hydrogen-like ions (GSI)

Monday 8 December 2008 11:40 (30 minutes)

At GSI Darmstadt, we have studied the decay of highly-charged heavy ions, stored and cooled in the experimental storage ring, ESR, by means of time-resolved Schottky-noise mass spectroscopy. The Fast Fourier Transform, FFT, of the Schottky noise is a non-destructive, non-instantaneous detection method, sensitive to a single heavy ion circulating in the ring. We have focused our interest on the two-body orbital electron capture decay of hydrogen-like ions, and have developed a method that allows us to identify unambiguously the decay channel and the decay time by observing both the parent and the daughter ions. We have investigated the decay of small numbers of particles stored and cooled in the ring, and we have observed deviations from the expected exponential decay of 140 Pr and 142 Pm ions [1]. In this contribution, I will concentrate on the motivation, on the method, and on the experimental findings of these studies.

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Session Classification: Existing Experiments