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Single differential projectile ionization cross sections $d\sigma/dE_e$ for 50 AMeV U^{28+} in the ESR storage ring SIEGBERT HAGMANN, PIERRE-MICHEL HILLENBRAND, THOMAS STOEHLKER, YURI LITVINOV, GSI-Darmstadt, APPA-SPARC COLLABORATION — The very high intensity beams of relativistic high Z ions with incident collision energies up to 2.7AGeV requested for experiments using the SIS100 synchrotron of FAIR require that 1.3 10^{11} ions at 2.6Hz be injected from SIS12/18 into SIS100. The needed luminosity of the beam can only be achieved for such high Z ions when - considering the space charge limit ($\sim A/q^2$) - a low charge state q of the ion to be accelerated keeps the particle density at the highest feasible level. For a thorough understanding of beam loss it is imperative that the mechanisms active in projectile ionization be understood quantitatively to provide benchmarks for advanced *ab initio* theories beyond first order. We have embarked on an experimental investigation of single differential projectile ionization cross sections $d\sigma/dE_e$ (SDCS) for single and multiple ionization of U^{28+} in the ESR storage ring by measuring the electron loss to continuum (ELC) cusp at 0^0 with respect to the beam axis employing our imaging forward electron spectrometer. This was motivated by the high relative fraction of multiple ionization estimated to exceed 40%. We report first results for absolute projectile ionization SDCS for U^{28+}. We find a remarkably high asymmetry for the ELC cusp. This is at strong variance with the line shape expected for validity of first order theories.

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