

Projectile Ionization of U^{28+} in the ESR Storage Ring

LOI for continuation of proposal E117

S. Hagmann¹, P.-M. Hillenbrand^{1,2}, J. Glorius¹, U. Spillmann¹, Yu. A. Litvinov¹,
B. Jurado³, M. Sguazzin³, J. Pibernat³, M. Lestinsky¹, A. Gumberidze^{1,4},
S. Trotsenko^{1,5}, M. Steck¹, R. Grisenti^{1,2}, N. Petridis^{1,2}, S. Sanjari¹,
S. Litvinov¹, B. Lorenz¹, R. Hess¹, D. Schneider⁶, H. Rothard⁷,
E. DeFilippo⁸, M. Benis⁹, C. Brandau¹, Th. Stöhlker^{1,5,10}

¹Atomic Physics, Helmholtzzentrum GSI, Darmstadt, Germany

²Inst. f. Kernphysik, J. W. v. Goethe Univ. Frankfurt

³Centre d'Etudes Nucleaires de Bordeaux, Gradignan(CENBG), France

⁴EMMI, Helmholtzzentrum GSI, Darmstadt, Germany

⁵Helmholtz Institut Jena, Jena, Germany, ⁶Lawrence Livermore Nat. Lab., Livermore,

⁷CIMAP, Ganil, Caen, France, ⁸INFN Catania, Catania, Italy, ⁹Univ. of Ioannina, Greece

¹⁰Physikalisches Institut, F. Schiller Universität Jena, Jena, Germany

within the SPARC Collaboration

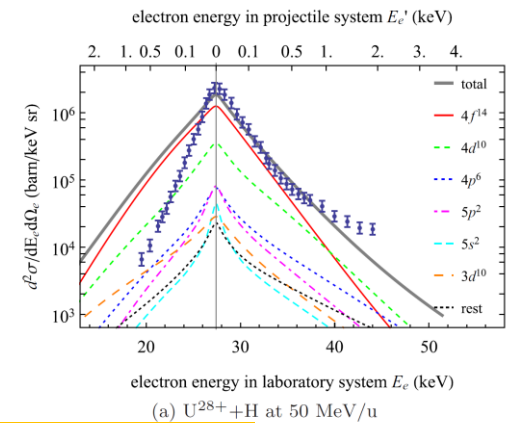
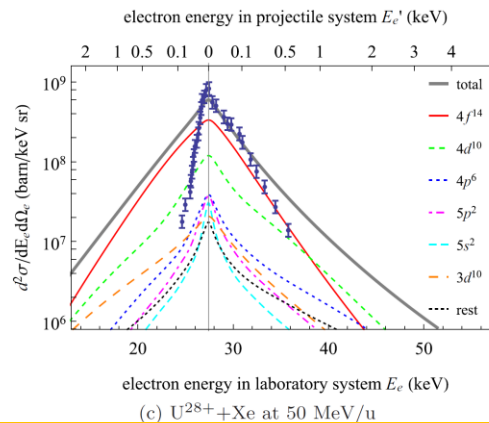
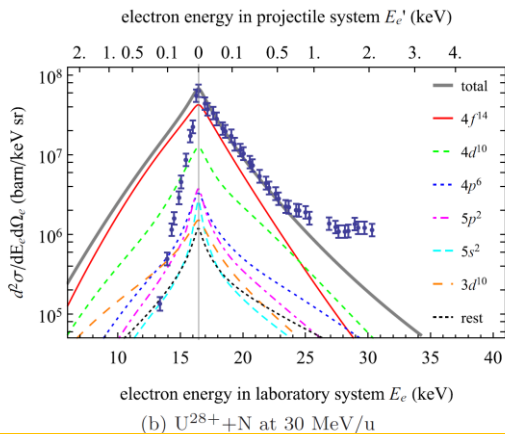
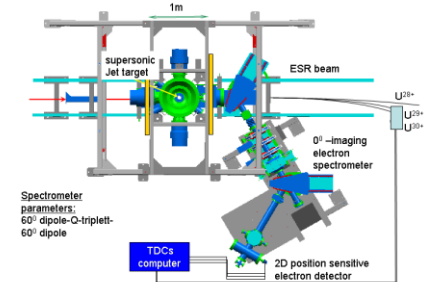
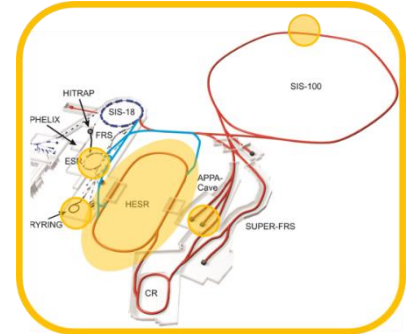
current status for ionization dynamics of U^{28+}

- ➔ theoretical studies of beam loss for U^{28+} in SIS100 give contradictory σ_{loss} and τ_{beam}
 - ➔ exper. σ_{diff} needed for ionization dynamics of U^{28+}
2. Results from E117 on projectile ionization of U^{28+} :

Asymmetric 0^0 Electron Loss to Continuum (ELC)

Cusp for $U^{28+} + H_2, N_2,$ and Xe

is Z_{target} dependent ➔ 1st order theories inadequate



1st order theories predict a symmetric ELC cusp from every subshell

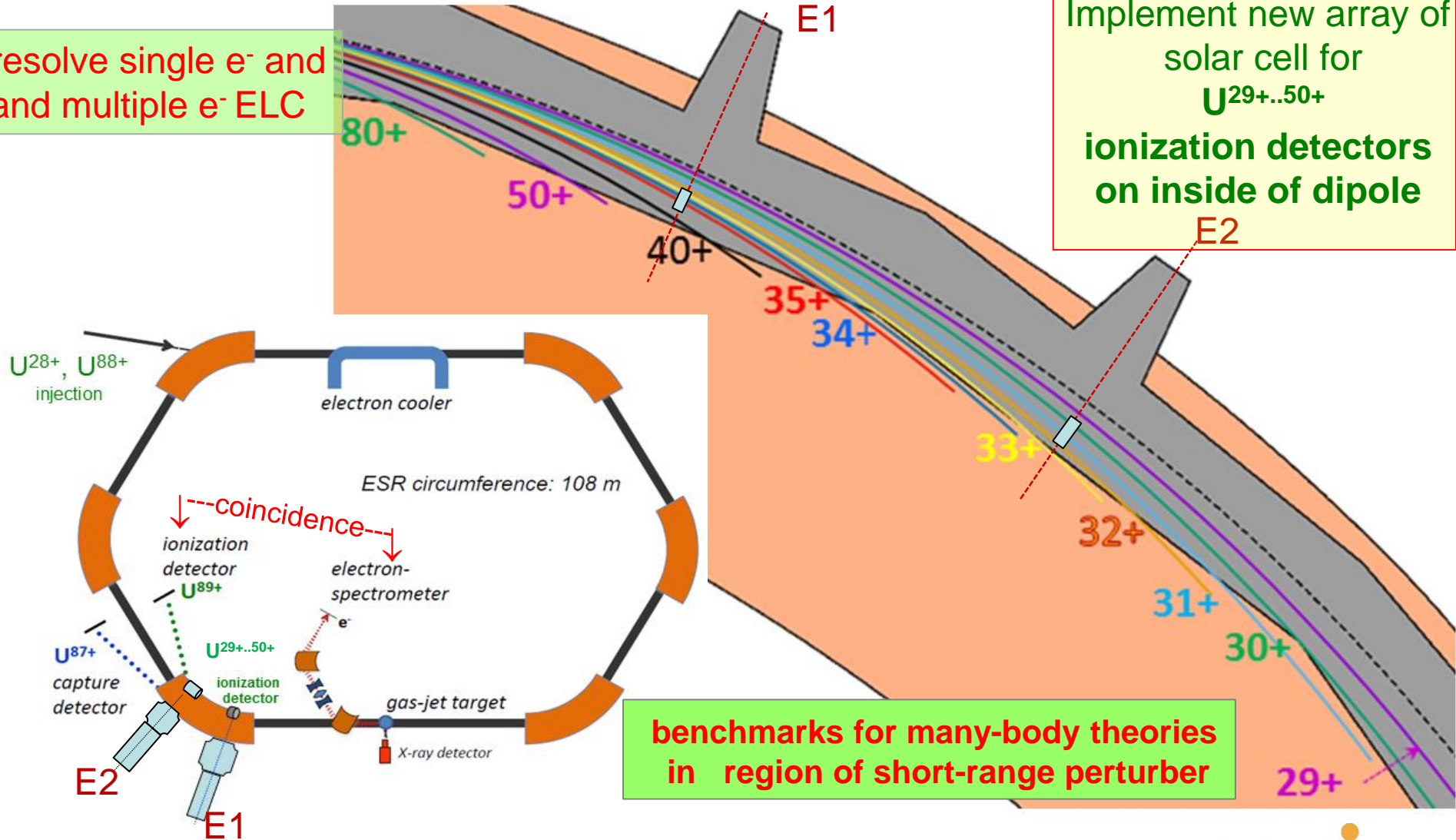
Towards differential cross section $\sigma^{n,diff}$ for 0^0 -ELC cusp:



↑-multiplicity coincidence-↑

resolve single e^{-} and multiple e^{-} ELC

Implement new array of solar cell for $U^{29+..50+}$ ionization detectors on inside of dipole E2



benchmarks for many-body theories in region of short-range perturber