

ATOMIC COLLISIONS WITH 33-TEV LEAD IONS¹

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Recent availability of relativistic and ultrarelativistic beams of heavy ions has permitted the first controlled studies of atomic collisions at energies sufficient to measure effects of several new basic phenomena. These include measurements substantiating recently predicted finite nuclear size effects resulting in a reduction in the total electronic energy loss of heavy ions in matter, and measurements of Coulomb collisions in which electrons are excited from the Dirac negative energy continuum. Measurements of total energy loss, free electron-positron pair production, and electron capture from pair production have been recently performed using 33-TeV Pb⁸²⁺ ions from the CERN SPS accelerator in Geneva. Results of these studies are presented, along with comparisons with relevant theory.

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