

Beam Halo due to Coulomb Elastic Scattering on the Residual Gas in an Accelerator, G. HAOUAT, N. PICHOFF, CEA-BIII/SPTN, Bruyères-le-Châtel; P.Y. BEAUVAIS, CEA Saclay - An experimental program has been set up to study the mechanisms of halo formation and development in the transport of an intense, low-energy, low-emittance proton beam through a periodic focusing FODO channel. Two different processes contribute to halo production: the transport dynamics of the intense charged-particle beam and the collisions of beam particles with the residual-gas nuclei. To provide a coherent interpretation of measurements of the beam transverse profile it is necessary to evaluate the importance of each process. Coulomb elastic scattering of beam particles on the residual gas in a transport channel is examined here. Using the basic differential cross section formula, which gives the probability for a particle to scatter at a given angle, the amount of those few particles which scatter at rather large angles is estimated. Simulations of the transport of a matched beam in a uniform focusing channel are presented. They show how the collision-induced halo develops. They are compared to measurements of the beam profile performed at different gas pressures.