AN ELECTRON- LIGHT ION COLLIDER BASED AT CEBAF

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An electron - light ion collider with center of mass energy between 20 and 30 GeV, luminosity starting at 10^{33} cm^{-2} sec^{-1} and polarization of both beams at or above 80% is being proposed for the study of hadronic structure. The proposed scheme would accelerate the electron beam using the CEBAF recirculating linac with energy recovery. If ~20 MV/m accelerating structures are installed in the CEBAF tunnel, then a single recirculation can result in an electron beam energy of about 5 GeV. After colliding with protons/light ions circulating in a storage ring at energy of 50 GeV, the electrons are re-injected into the CEBAF accelerator for deceleration and energy recovery. In this report several layout options and their respective feasibilities will be discussed, parameters for the required luminosity presented and accelerator physics issues discussed for both protons/light ions and electrons. The feasibility of a combined fixed target program at 25 GeV and collider program with a center-of-mass energy of 30 GeV is also explored.

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