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Tandem-ElectroStatic-Quadrupole for Accelerator-Based BNCT.

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We report here on a project to develop a Tandem-ElectroStatic-Quadrupole (TESQ) accelerator for BNCT, started in Argentina in collaboration with LBNL. The project goal is a machine capable of delivering 30 mA of approx. 2.3 MeV protons to be used in conjunction with a neutron production target made of a refractory Li compound and based on the ^{7}Li(p,n)^{7}Be reaction slightly beyond its resonance at 2.25 MeV. The technologically simplest and cheapest solution points to an electrostatic machine. Existing electrostatic accelerators, produce only a few mA of proton beam current limited by the column design. High beam current density, as implied by a size limited 30 mA proton beam, needs strong focusing in the transverse plane. In this regard ESQs are much stronger than the aperture lens used in conventional Tandem accelerators. An ESQ column can be designed using a lower field stress than a Pierce column in multi-MeV beam energy applications. Strong transverse fields will also suppress secondary electrons sideways through the electrodes hence preventing induced X-rays and electrical breakdown. In the present work a compact combination of an ESQ column with a Tandem in a folded geometry is discussed. This option would allow the ion source to be operated at ground potential and would require the production of only 1.15 MV to reach the desired 2.3 MeV proton energy. On the other hand such a machine requires an H^- ion source and the transport of a high intensity beam through a gas stripper.