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HELIA-High Energy Linear Induction Accelerator*

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A novel approach to providing high voltage (>10 MV), high current (>200 kA), short duration (20-40 ns), particle beam pulses is described. The approach uses 1 MV Metglas isolated cavities driven by water pulse lines. These are stacked in series by using a magnetically insulated cathode stalk. Results from modeling of the cavity and cores and from a full sized single-cavity experiment are discussed. Plans for a four-cavity experiment to prove the principle of voltage addition by stacking cavities on a magnetically insulated transmission line are also described. The single-cavity experiments produced a 1.1 MV, 30 ns FWHM, 12 ns rise time, 250 kA electron beam. The HELIA pulsed power system and cavities are described. Particle-in-cell (PIC) computer simulations of the four-cavity experiment and the four-cavity conceptual design are discussed.

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