A plasma focus driven by a capacitor bank of tens of joules
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As a first step in the design of a repetitive pulsed neutron generator, a very small plasma-focus device has been designed and constructed. The system operates at low energy (160 nF capacitor bank, 65 nH, 20-40 kV, and ~32-128 J). The design of the electrode was assisted by a computer model of the Mather plasma focus. A single-frame image converter camera (5 ns exposure) was used to obtain plasma images in the visible range. The umbrella-like current sheath running over the end of the coaxial electrodes and the pinch after the radial collapse can be clearly observed in the photographs. The observations are similar to the results obtained with devices operating at energies several orders of magnitude higher. The calculations indicate that yields of $10^4$-$10^5$ neutrons per shot are expected with discharges in deuterium.