

**INFLUENCE OF PREIONIZATION ON THE
NEUTRON YIELD AND PULSEWIDTH OF A 500J
PLASMA FOCUS***

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Poor initiation could be the reason that some plasma focus devices show a poor reproducibility shot to shot. A recent publication by Verma et al¹ suggests that operating a small plasma focus at higher repetition rates increase the neutron yield for a given stored energy by as much as 10×. It is hypothesized that the residual ionization from one pinch helps better initiate the pulse of the subsequent pinch. This implies that a minimum initial (seed) electron density is required for improvement in neutron yield. In order to better understand the importance of such residual ionization, two pre-ionization methods were implemented on a 500J plasma focus operating at 10-13kV. The first method is a DC discharge in the 1-100 mA range. The second method is a pulsed discharge of ~100μs duration in the 100A range. Both pre-ionization techniques use positive bias applied to the plasma focus anode.

The neutron yield, neutron pulse width and shot to shot reproducibility of the source are examined using these two methods of pre-ionization.

1. Rishi Verma, R S Rawat, P Lee, S V Springham, T L Tan and M Krishnan, "Realization of enhancement in time averaged neutron yield by using repetitive miniature plasma focus device as pulsed neutron source" J. Phys. D: Appl. Phys. 42 (2009) 235203 (7pp)

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