Numerical experiments on plasma focus neutron yield versus pressure compared with laboratory experiments

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Abstract
Published literature shows that the neutron yield of the plasma focus has been modeled in two papers using a thermonuclear mechanism. However, it is more widely held that plasma focus neutrons are produced mainly by non-thermalized mechanisms such as beam–target. Moreover, these papers use several parameters which are adjusted for each machine until the computed neutron yield $Y_n$ data agree with measured $Y_n$ data. For this paper numerical experiments are carried out, using the Lee model code, incorporating a beam–target mechanism to compute the $Y_n$ versus pressure data of plasma focus devices PF-400 J and FN-II. The Lee model code is first configured for each of these two machines by fitting the computed current waveform against a measured current waveform. Thereafter all results are computed without adjusting any parameters. Computed results of $Y_n$ versus pressure for each device are compared with the measured $Y_n$ versus pressure data. The comparison shows degrees of agreement between the laboratory measurements and the computed results.

1. Introduction
The dense plasma focus produces copious multi-radiation, including a wide spectrum of photons and particles, which is the subject of many studies and applications. From many devices and experiments, a large array of data and information leading to interesting discussions. For example, to explain the observed fast particles with energies up to mega-electron volt emitted from devices operating at tens of kilovolts, mechanisms such