

# 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 have been gathered a large array of data and information leading to interesting discussions. For example, to explain the observed fast particles with energies up to megaelectronvolt emitted from devices operating at tens of kilovolts, mechanisms such