

Complex electrical, mechanical and thermal effects on the structural elements of mega-ampere plasma focus chambers

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Plasma focus (PF) devices are one of the most powerful sources of pulsed neutron radiation due to the nuclear fusion reactions of hydrogen isotopes [1]. When plasma focus chambers are operating as a part of this powerful devices with mega-ampere discharge currents, serious complex effects are applied to the electrodes and the Insulating unit of the PF chambers. The gas-discharge plasma located in the PF chambers in the form of a moving current-plasma shell and a high-current pinch discharge has mechanical, thermal and electrical effects due to its accelerated movement, high discharge current and pinch collapse, respectively. The paper presents experimental results of the operation of PF chambers in a device with a discharge current of up to 1.2 MA, shows the results of the listed effects and examines the relationship between electrical, mechanical, temperature effects and changes in the construction of PF chambers and their performance characteristics.

- [1] Yurkov D I, Dulatov A K, Lemeshko B D, Golikov A V, Andreev D A, Mikhailov Y V, Prokuratov I A and Selifanov A N 2015 *Journal of Physics: Conference Series* **653**