

## Plasma Focus Device and Fusion

A. Kulińska

*Institute of Nuclear Physics Polish Academy of Sciences, Kraków, Poland  
Agnieszka.Kulinska@ifj.edu.pl*

### Abstract

The lecture summarizes research related to the Plasma-Focus (PF) device, in terms of understanding the physical processes determining the behavior of dense plasma with temperatures on the order of keV in the Z-Pinch geometry. The role of phenomena occurring in the plasma generated in the PF system, leading to the fusion of light hydrogen nuclei, will be presented. Based on experiments carried out in various PF systems, the basic issues related to thermonuclear fusion in PF device will be described.

Thus, the lecture will focus on the following topics:

Conditions for carrying out a nuclear fusion reaction – types of reactions, cross sections and their rates. Moreover, the parameters of the medium in which the synthesis reactions take place will be discussed.

Description of the Plasma-Focus device and the physical principles of its operation on the basis of experiments and models describing the behavior of plasma.

Conditions for carrying out controlled nuclear fusion in a PF device, based on the scaling law for PF systems.

Summary of the most important issues and problems related to the nature of the fusion reaction in the Plasma-Focus device and the final conclusions with a special emphasis on the reactions without neutron production such as proton boron or deuterium helium-3.