

# 2nd IAEA Technical Meeting on the Collisional-Radiative Properties of Tungsten and Hydrogen in Edge Plasma of Fusion Devices

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## Redesign of EAEA Plasma Focus Device-1

- Egyptian Atomic Energy Authority –Plasma Focus device 1 (EAEA-PF1) was successfully redesigned in terms of its electrode system material and dimensions, insulator shape and the energy storage bank to investigate the best plasma focus action.
- A simple-to-perform technique was applied to investigate the distribution of the azimuthal magnetic field induction and the induced magnetic force acting on the plasma current sheath.
- The redesigned device can be efficiently used in many important applications including Controlled Fusion and working as Neutron and X-ray Source.
- Plasma Focus (PF) devices are considered as one of the most effective sources of pulsed neutron emission which is relevant for controlled fusion.
- Using deuterium as the filling gas, fast neutrons with energy of around 2.5 MeV and energetic protons with the energy of around 3 MeV are produced from PF devices [1].
- A passive radioactive source of fast neutrons with similar energy emits continuously, causing inconveniences in handling and storing. In turn, PF generators do not have activation problems for storage and handling [2].
- PF devices have the advantage of the ability to operate with some other types of gases or gas mixtures which makes it a generator of a pure x-ray radiation (not accompanied by the neutrons) [3].
- Redesigning the device was the first step to be able to use it in these applications.
- X-ray and Neutron yield had to be improved to make the device applicable in these applications which couldn't be done without modifying the device.

### References:

- [1] R. Verma et. al, Plas. Sour Sci. and Tech., Vol. 17, p. 045020, 2008.
- [2] P. Silva et. al, Applied Physics Letters Vol. 83, No. 16, 2003.
- [3] A. V. Dubrovsky et. al, NUKLEONIKA, Vol. 45, no. 3, p. 185–187, 2000.
- [4] A. A. Lashin et. al, Plasma Sci. Technol. Vol. 23, 7, 075405 (2021).

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