

## Analysis of Soft and Hard X-Ray Intensities Using Different Shapes of Anodes in a 4kJ Mather Type Plasma Focus Facility

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**Abstract :** The effect of different anode tip geometries on the intensity of soft and hard x-ray emitted from a 4 kJ plasma focus device is investigated. For this purpose, 5 different anode tips are used. The shapes of the uppermost region of these anodes have been cylindrical-flat, cylindrical-hollow, spherical-convex, cone-flat and cone-hollow. Analyzed data have shown that cone-flat, spherical-convex and cone-hollow anodes significantly increase X-ray intensity respectively in comparison with cylindrical-flat anode; while the cylindrical-hollow tip decreases. Anode radius reduction at its end in conic or spherical anodes enhance SXR by increasing plasma density through collecting a greater mass of gas and more gradual transition phase to form a more stable dense plasma pinch. Also, HXR is enhanced by increasing the energy of electrons colliding with the anode surface through raise of induced electrical field. Finally, the cone-flat anode is introduced to use in cases in which the plasma focus device is used as an X-ray source due to its highest yield of X-ray emissions.

**Keywords :** plasma focus, anode tip, HXR, SXR, pinched plasma

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