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X-ray Imaging and preliminary studies of the X-ray self-emission from an innovative plasma-trap based on the Bernstein waves heating mechanism C. CALIRI, Columbia University, INFN-LNS, F.P. ROMANO, CNR-IBAM INFN-LNS, D. MASCALI, S. GAMMINO, A. MUSUMARRA, G. CASTRO, L. CELONA, L. NERI, C. ALTANA, INFN- LNS — Electron Cyclotron Resonance Ion Sources (ECRIS) are based on ECR heated plasmas emitting high fluxes of X-rays. Here we illustrate a pilot study of the X-ray emission from a compact plasma-trap in which an off-resonance microwave-plasma interaction has been attempted, highlighting a possible Bernstein-Waves based heating mechanism. EBWs-heating is obtained via the inner plasma EM-to-ES wave conversion and enables to reach densities much larger than the cut-off ones. At LNS-INFN, an innovative diagnostic technique based on the design of a Pinhole Camera (PHC) coupled to a CCD device for X-ray Imaging of the plasma (XRI) has been developed, in order to integrate X-ray traditional diagnostics (XRS). The complementary use of electrostatic probes measurements and X-ray diagnostics enabled us to gain knowledge about the high energy electrons density and temperature and about the spatial structure of the source. The combination of the experimental data with appropriate modeling of the plasma-source allowed to estimate the X-ray emission intensity in different energy domains (ranging from EUV up to Hard X-rays). The use of ECRIS as X-ray source for multidisciplinary applications, is now a concrete perspective due to the intense fluxes produced by the new plasma heating mechanism.

Claudia Caliri
Columbia University, INFN-LNS

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