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4P44 - Analysis for the Generation of Extreme Ultraviolet (EUV)/Soft X-Ray Radiations based on Short Pulse Electron Beams

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Extreme ultraviolet (EUV)/soft X-ray radiations are highly important in the growing areas of surface modification of polymers for biocompatibility improvements, radiography of small objects for potential biological applications, etc. [1-2]. In this work, theoretical and plasma simulation studies have been presented for the generation of EUV/soft X-ray radiations from the pseudospark discharge (PSD) based short pulse, high density and energetic electron beams. Recently, PSD electron beam based devices are found to be most suitable for the generation of EUV/soft X-ray radiations [2-4]. The energetic PSD based electron beam is responsible for the electron impact excitation/de-excitation of background gas atoms for the emission in the range of EUV/soft X-ray. The investigation is presented for the electron impact excitation/de-excitation of background gas atoms due to scattering of propagated short pulse and energetic electron beams at different operating conditions. The transitions of gas atom/ions have also been explored for the emission of EUV/Soft X-ray radiation. It has been observed that the EUV/soft X-ray radiations are strongly influenced by the beam parameters, gas and pressures.

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[3] Varun, et. al, IEEE Trans. Electron Devices, vol. 65, no. 10, pp. 4607-4613, 2018.

[4] Varun et. al, IEEE Trans. on Plasma Sci., vol. 46, no. 6, pp. 2003-2008, 2018.

Author: Mr SHARMA, NAVIN KUMAR (School of Physics, Devi Ahilya University, Indore-452001, India)

Co-authors: ., Varun (CSIR- CEERI, Pilani, India and AcSIR, Ghaziabad, India); PAL, Udit Narayan (CSIR-Central Electronics Engineering Research Institute, Pilani, India); Prof. CHOYAL, Y. (School of Physics, Devi Ahilya University, Indore-452001, India)

Presenter: ., Varun (CSIR- CEERI, Pilani, India and AcSIR, Ghaziabad, India)

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