

# EFFICIENT HARD X-RAY GENERATION IN AN INTERACTION OF INTENSE, ULTRASHORT LASER WITH METAL NANO-COATED DIELECTRIC TARGET

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Hard x-ray emission in intense laser-matter interaction studies is a topic of great interest due in significant part to its various applications [1]. We measure the hard x-ray yield from Ag nano-coated thick BK-7 glass target interacting with an intense femtosecond laser and compare the results with those from an uncoated BK-7 target. The enhancement in integrated hard x-ray yield is measured as a function of thickness of Ag nano-coating which was varied from tens of nanometer to hundreds of nanometer. The effect of laser polarization on hard x-ray yield is studied. Maximum enhancement (20x) is observed for a coating thickness of 35 nm for a p-polarized pump laser of relativistic intensity ( $\sim 10^{19}$  W/cm<sup>2</sup>). For the coating thicknesses of more than 100 nm, the x-ray enhancement factor is found to be flat. The x-ray yield from uncoated BK-7 target is found to be the same for the two polarizations of the pump laser. Additionally, it is observed that the X-ray enhancement for coating thickness of 42 nm is greater for the p-polarized pump laser as compared to that for s-polarized pump laser. We compare our results with those from earlier studies [2, 3] and discuss the implications.

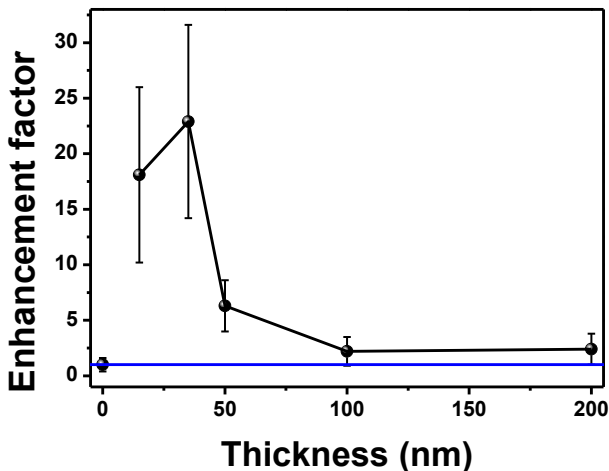


Fig.1. X-ray enhancement factor as a function of thickness of silver coating. Blue line corresponds to enhancement factor of unity.

- [1] T. Pfeifer *et al.*, *Rep. Prog. Phys.* **69** 443-505(2006)
- [2] P.P. Rajeev *et al.*, *Phys. Rev. Lett.* **90**, 115002(2003)
- [3] S. Mondal *et al.*, *Phys. Rev. B* **83**, 035408(2011)