Overview of Laser-driven Short-wavelength Sources at PALS and ELI Beamlines

J. Nejdl,[1,2*] M. Kozlová,[1,2] V. Nefedova,[1,4] M. Albrecht,[1,4] S. Sebban,[1,3] J. Gautier,[1,3] and G. Korn[1]

[1] *IoP ASCR, ELI Beamlines project, Na Slovance 2, Prague 8, 182 00, Czech Republic*
[2] *IPP ASCR, Za Slovankou 3, Prague 8, 182 00, Czech Republic*
[3] *LOA, ENSTA, Chemin de la Hunière, 91761 Palaiseau, France*
[4] *FNSPE of the CTU in Prague, Czech Republic*
**e-mail: nejdl@fzu.cz*

Abstract: *We present recent activities at PALS research centre dedicated to development of short-wavelength radiation sources through various processes using 20 TW Ti:sapphire laser chain as well as kJ sub-ns iodine laser system and plans for the implementation of a high-order harmonic beamline employing 1 kHz 100 mJ 20 fs laser system at upcoming ELI Beamlines facility.*

There are two types of coherent XUV sources being developed at PALS research centre: high-order harmonic generation from various gaseous targets and collisionally pumped soft X-ray lasers. The study of conditions for improving conversion efficiency of high-order harmonic generation, such as Phase-Matching and Quasi-Phase-Matching in loose focusing geometry, will be presented. Overview of the local research dedicated to plasma-based soft X-ray lasers from solid targets driven either in a quasi-steady state regime using sub-nanosecond kJ laser system or transient regime with grazing incidence pumping driven by Ti:sapphire laser chain with pulse energy of 1 J and repetition rate of 10 Hz will be given.

Employing more powerful lasers, which should be soon available at ELI Beamlines facility near Prague, we suppose to scale-up the brightness of secondary sources of short-wavelength radiation by few orders of magnitude. Plans for the implementation of a high-order harmonic beamline driven by 1 kHz 100 mJ 20 fs laser system will be shown.