

## **OPTICAL SYSTEMS FOR LASER PRODUCED PLASMA EUV AND SOFT X-RAY SOURCES**

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Laser produced plasmas (LPP) created using high peak power lasers emit intense radiation from a wide wavelength range spanning visible light (VIS), ultraviolet (UV), extreme ultraviolet (EUV) and soft X-rays (SXR). The EUV and SXR radiation is strongly absorbed in any kind of matter, hence, propagates only in vacuum. Any optical systems dedicated for this radiation can contain only reflective or diffractive elements. To obtain EUV or SXR beams of high fluence usually the reflective optics are being used.

In this work different kinds of optical systems dedicated for efficient focusing of the LPP EUV or SXR radiation are presented. The systems, based on different kinds of grazing incidence mirrors, allow to obtain intense EUV/SXR pulses. These radiation pulses can be employed in experiments concerning interaction with matter, low temperature plasma formation or warm dense matter investigation. Such systems can be also used for detection of EUV pulses, of low intensity, emitted from EUV induced, low temperature plasmas. In this work the most significant problems connected with temporal investigation of such plasmas produced in vacuum are described. Detection systems based on different kinds of EUV mirrors used for temporal investigation of the weak radiation pulses are presented. The systems utilize ellipsoidal or paraboloidal, grazing incidence mirrors coupled to high speed semiconductor detectors dedicated for the EUV range. Additionally a possibility of detection of selected spectral lines using a combination of grazing incidence and multilayer mirrors is described.