Laser plasma based source system for testing of VUV optical elements

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Optical elements dedicated for the VUV range can be characterized using synchrotron radiation or VUV lamps. In the latter case the VUV radiation is transmitted through a special, MgF_2 window, limiting the spectrum on the short-wavelength side, to $\lambda{\sim}120\ nm$. On the other hand laser produced plasma (LPP) sources emit radiation in a wide wavelength range including the VUV range.

The article presents a laboratory LPP source system, with selection of the VUV wavelength range, allowing to measure transmission curves of VUV filters. The source is based on a double stream KrXe/He gas puff target irradiated with nanosecond laser pulses, from an Nd:YAG laser. The Kr/Xe gas mixture is the working gas for the plasma production, however, if necessary, can be replaced with other gases. The source emits intense radiation in a wide spectral range from EUV to the visible light. To eliminate the EUV radiation the system is equipped with an Al coated mirror, positioned under an incident angle 45°. A schematic view of the system is shown in Fig. 1. Initial tests indicated a strong suppression of the EUV radiation up to 70 nm. Spectral measurements performed with and without the filter to be tested, mounted between the source and the spectrometer, allow to determine the transmission curve.

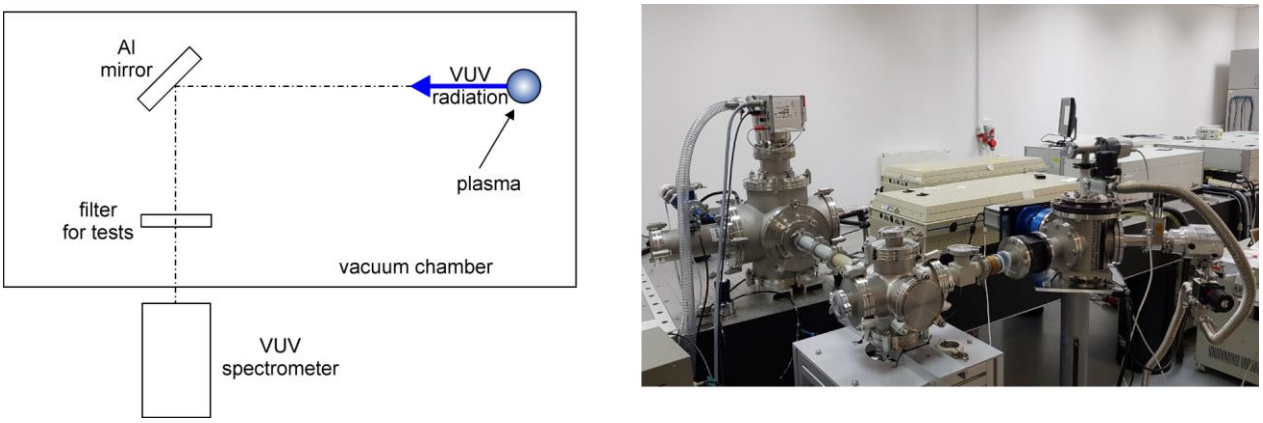

Figure 1. Scheme and a view of the VUV system