Investigations of a laser-produced microdroplet tin-plasma as a source of extreme ultraviolet radiation for nanolithography

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The semiconductor industry is currently moving from deep-ultraviolet to extreme-ultraviolet (EUV) lithography for high volume manufacturing of the next generation of microelectronics, where the shorter wavelength of the EUV radiation enables further miniaturization. At ARCNL we are investigating the physical properties of a laser-produced plasma of tin-microdroplets, which has become the standard for a powerful source of radiation at the wavelength of choice: 13.5 nm. The studies range from the plasma propulsion and deformation of tin-droplets [1], the spectroscopy of highly-charged tin ions Sn^{9+}- Sn^{14+} producing the EUV radiation at 13.5 nm [2], the EUV generation under Nd:YAG laser excitation in comparison to CO_2 laser excitation [3], and the production of kinetic energies of Sn-ions from the plasma under picosecond and nanosecond irradiation [4].

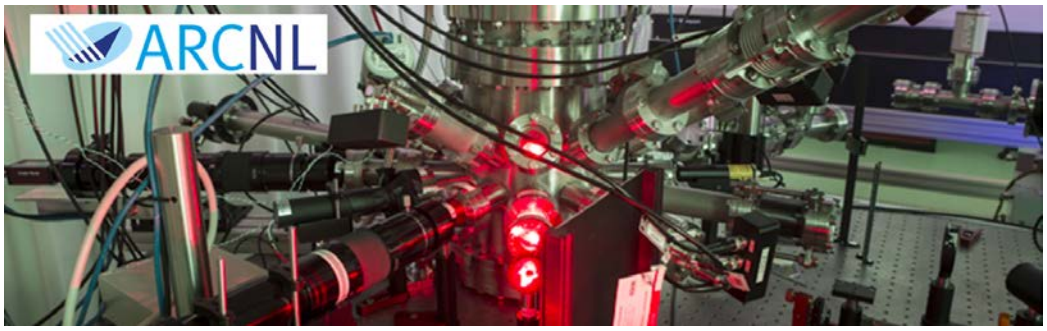

Figure 1: View on the LPP microdroplet tin plasma source and diagnostic instrumentation.

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