Synopsis  The EUV Plasma Dynamics group at ARCNL aims at the understanding of the physics of laser-produced plasma (LPP) EUV sources on an atomic and molecular level, underpinning the operation of contemporary and future light sources for nanolithography.

**Fundamental investigations of laser-produced plasma for a 13.5nm Extreme Ultra-Violet (EUV) light source**

The grand challenges:
- Increase and optimization of the in-band EUV conversion efficiency (CE)
- Reduction and control of fast multicharged plasma-born Sn\(^{x+}\) ions
- Minimize damage to plasma-facing components

AND think ahead ...
- Develop models to decide on future routes for plasma EUV generation
- What other materials and processes can we use to generate EUV?

**Plasma diagnostics: temporally and spatially resolved spectroscopy and imaging in functional EUV source**

**„in-vitro“ high-precision spectroscopy: light and ions**

Laser spectroscopic investigations of plasma produced molecules and radicals Sn\(_2\)H\(_4\) using setups at VU and ARCNL.

Collisonal cross-sections: tin-matter interactions using available beamline facilities in Groningen.

High resolution mass spectrometry of ion species ejected from plasma.

Light-matter interactions are studied using ion traps at external facilities such as synchrotrons and free electron lasers (FEL).

**Optical, DUV, and EUV spectroscopy of highly charged tin in an electron beam ion trap (EBIT)**

What can we learn from line emission, in the optical or DUV regimes, of highly charged tin Sn\(^{x+}\)?

EBIT enables charge state resolved high-resolution spectroscopy, be it passive, or active, with laser, synchrotron, X-FEL radiation.

Which other ions are suitable? Next generation XUV lithography?