XUV-LAB-Sources  
Beamlines for the R&D-Lab

Stand-Alone laboratory sources of XUV, EUV and soft-x-rays (1-50 nm) are the one key element to bring technologies proven at beamlines at storage rings to the research and industrial lab.

Plasma based sources can reach similar performances of the lab-experiments as achieved at end-stations. They can provide at site availability whenever required, without long downtime periods. However, LAB-XUV-sources cannot provide the same high general flexibility as storage ring beamlines can.

Hence Bruker ASC provides a portfolio of platforms which cover many of the demands, e.g. in:
- Wavelength range
- Band width (Line or continuous)
- Total or spectral power
- Brightness

Selection of the right source

The source type selection is under consideration of the intended application:
- LPP sources are selected when high brightness issues and good continuous coverage of a broad band spectral range (e.g. from 2 to 20 nm) is required.
- DPP sources are selected when economic high photon flux or flexible change of spectral distribution is required. With the latter the features of our DPP sources to be operational with all gaseous media allows for matching the spectral emission characteristics to the demand.

For the whole spectral range from 2 - > 20 nm quasi-continuous and line
emitting characteristics can be found and selected by the choice of the working “gas” resp. target material. Some target materials are easier to use with one source type e.g. gases in DPP or solid material for LPP. However, also gases can be used with LPP e.g. as jets or liquids and solids as compounds or natural vapor in DPP.

**General Technologies**

Our LAB-XUV sources comprise two general technologies under investigation since the late 90’s, i.e. Hollow cathode triggered gas discharges in our EUV-Lamps and laser produced plasma sources.

**Technical background**

Our LAB-XUV source competence is based on work on plasma based sources at the Fraunhofer Institute for Lasertechnics (FHG-ILT) which started in the mid-80s with source realization for x-ray microscopy and x-ray lithography.

Since 2000 FhG-ILT supported its spin-offs AIXUV and Philips EUV. Since 2006 Bruker ASC (Accel) is working on a source for x-ray microscopy with the Fraunhofer institute for Lasertechnology. Partnerships with the Rhein-Ahr-Campus, Remagen; Hannover University and the Max-Born Institute, Berlin and the Laserzentrum Hannover supplement our activities.

<table>
<thead>
<tr>
<th>EUV-Lamp</th>
<th>LPP</th>
<th>EUV-Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2</td>
<td>V3</td>
<td>V4</td>
</tr>
<tr>
<td>Rep Rate, Hz</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>E/Pulse, mJ/str</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Photons per Pulse / sr</td>
<td>3.8E+13</td>
<td>3.8E+13</td>
</tr>
<tr>
<td>Source Diameter, μm</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>EUV-Power, mW (2 pi sr), 2% BW</td>
<td>314</td>
<td>628</td>
</tr>
<tr>
<td>Photons / s / mrad^2</td>
<td>3.8E+09</td>
<td>6.6E+09</td>
</tr>
<tr>
<td>Photons / s / mrad^2/mm^2 (0.1 %)</td>
<td>8.5E+08</td>
<td>1.7E+09</td>
</tr>
</tbody>
</table>

Summarized top-level specification table of our XUV sources

**Our Research partners:**

www.bruker-asc.com  ⚫ Bruker ASC GmbH
Bergisch Gladbach · Germany
Dr. Rainer Lebert
Phone +49 (0) 2204/84-3981
Fax +49 (0) 2204/84-5001
rainer.lebert@bruker-asc.com

© Bruker ASC GmbH 07/10. Bruker ASC are continually improving their products and reserve the right to change specifications without notice.