

Status of the Positron Sources at the Superconducting Electron LINAC ELBE

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The Helmholtz-Center Dresden-Rossendorf operates several user beamlines for materials research using positron annihilation energy and lifetime spectroscopy. The superconducting electron LINAC ELBE [1] serves as a driver for hard X-ray production from electron-bremsstrahlung, which in turn generates positrons through pair production. **GiPS**, the Gamma-induced Positron Source directly generates electron-positron pairs inside the sample under investigation [2]. The source is especially suited for materials, which are not qualified for vacuum conditions or because they impose hazards or intrinsic radioactivity.

MePS, the Mono-energetic Positron Source utilizes positrons with fixed kinetic energies ranging from 500 eV to 18 keV [3] for thin film studies, which allows depth profiling. A magnetic beam transport system guides positrons passing on the way chopping, bunching, and accelerator sections to the samples under investigation. The simultaneous operation of chopping and bunching techniques supported by digital acquisition generates nearly background and distortions free spectra as well as offers timing resolution down to about 210 ps.

The **MePS** facility is currently complemented by additional beamline **AIDA-II** - Apparatus for In-situ Defect Analysis - where defect investigations can be performed *in-situ* in a wide temperature range during thin film growth and under ion irradiation. To further improve timing resolution additional $\lambda/4$ buncher has been recently installed and commissioned. Complimentary, functionally similar setup, **AIDA-I** [4], is in operation at a ²²Na-based mono-energetic continuous positron beam [5] used for *in-situ* Doppler-broadening positron annihilation spectroscopy experiments.

Recent developments at all beam lines as well as some exemplary experiments will be presented.

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