

## The Pulsed Low Energy Positron System PLEPS: New Developments and Applications to Polymer and Membrane Layers

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The pulsed low energy positron system PLEPS [1] is a user facility for defect depth-profiling with positron lifetime measurements using a monochromatic pulsed positron beam of variable implantation energy at the intense positron source NEPOMUC at the MLZ in Garching, Germany [2].

At present, it is possible to measure with PLEPS positron lifetime spectra in the energy range between 0.5 keV and 20 keV with count-rates between 5000-10000 counts per second, depending on the sample. It takes typically about 10 minutes for a lifetime spectrum with more than  $3 \times 10^6$  counts at a single energy. A full depth-profile with 10-15 energies requires about 2-4 hours. Depending on the detector, an overall time-resolution of 220 ps-280 ps and peak-to-background ratios of up to  $1 \times 10^5$  can be routinely achieved with a time-window of 40 ns [3]. For precise measurements of long lifetimes ( $> 5$  ns) it is now possible to extend the time window to 160 ns at an overall time resolution of 300 ps.

Besides defect identification in thin layers and layered structures of semiconductors, insulators, irradiated materials typical applications of PLEPS comprise also the characterization of open volumes in glasses [4], polymers, polymer- and membrane layers [5].

In this talk we will describe the present setup of PLEPS and its performance, show some exemplary applications in the field of polymers, polymer and membrane layers and give an outlook of new developments.

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