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Low-Energy Positron Beam for Near-Surface Doppler-Broadening Spectroscopy

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A new positron beam setup has been put into operation for Doppler-broadening experiments with low energy positrons in order to allow the investigation of surfaces and near-surface defect structures. Positrons provided by a ^{22}Na source are moderated in a $1\ \mu\text{m}$ single crystalline tungsten foil from which they are guided to the sample chamber by longitudinal and transverse magnetic fields. The positrons are accelerated electrostatically by a potential difference applied between moderator and sample. Kinetic energies as low as 1 eV and up to 30 keV are possible. Inside the UHV chamber the positron beam is focused onto the sample by an electrostatic single lens.

Instead of the standard sample holder a heatable one can be mounted.

This setup is intended to complement the positron instrument suite at NEPOMUC and expands capabilities in the field of defect studies at and near the surface. First experimental results on oxides will be presented.

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