

Recent Developments at the Resonant Scattering and Diffraction Beamline P09 at PETRA III at DESY

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Beamline P09 at PETRA III at DESY allows for state of the art resonant X-ray elastic scattering (REXS) experiments on strongly correlated and magnetic materials in high magnetic fields and at low temperatures in a wide range of X-ray energies covering the L_{II},L_{III} absorption edges of the 3-5d transition metals and 4f lanthanides, and the M_{IV} and M_V absorption edges of the 5f actinides [1,2]. Since 2016, the beamline is equipped with new phase retarder plates allowing for full polarization control between 2.7 and 13.2 keV. We have further worked at extending the experimental capabilities so as to enable: (a) magnetic X-ray scattering at low temperatures in the tender X-ray range (b) magnetic X-ray scattering at high pressure and low temperatures and (c) X-ray magnetic circular dichroic experiments on powders and on thin films [3]. As well, the development of a crystallographic computing software analysis tool MagStREXS has been initiated to help the REXS user community with magnetic structure determinations from resonant X-ray scattering data. Hereby I will present the instrument, a snapshot of the recent developments and related future plans and some of the scientific results obtained so far on selected compounds.

References

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- [3] - Mardegan J. R. L; Francoual S.; Fabbris G.; *et al.*; *Magnetic properties of GdT2Zn20 (T=Fe, Co) investigated by x-ray diffraction and spectroscopy*; Phys. Rev. B 93, 024421 (2016)