

Pieter Glatzel studied physics at the Universities of Mainz and Hamburg/Germany. During his PhD he worked at the University of California at Davis and the Lawrence Berkeley National Laboratory. After a post-doctoral stay at the University of Utrecht he went to the European Synchrotron Radiation Facility (ESRF) where he is now developing photon-in-photon-out spectroscopies.

Title: Hard X-ray photon-in photon-out spectroscopy

### **Abstract**

Spectroscopy of fluorescence and scattered hard X-rays using analyzer crystals has a long history. The potential as an analytical tool has always been recognized but the technique is only now rapidly developing at synchrotron radiation sources.[1, 2] The reason for this is not only the high brilliance and advances in spectrometer instrumentation but also a deeper theoretical understanding. Furthermore, the wealth of different techniques that becomes available with the installation of an emission spectrometer at a synchrotron beamline is now being discovered by the applied fields such as chemistry, biology, environmental sciences and geology. Such an instrument may complement and improve the current standard XAS experiments and opens up possibilities for detailed studies of the electronic structure using a photon-in photon-out technique. The hard X-ray probe makes all techniques suitable for in-situ studies and experiments under extreme conditions (e.g. high pressure). The presentation will aim to convey this potential by giving an overview with examples from various fields. I will also point to current bottle necks that need to be addressed in order to advance this technique and make it available to a large user community.

- [1] F.M.F. de Groot and A. Kotani, *Core Level Spectroscopy of Solids*. Advances in Condensed Matter Science, ed. D.D. Sarma, G. Kotliar, and Y. Tokura. Vol. 6. 2008, New York: Taylor and Francis.
- [2] P. Glatzel and U. Bergmann, "High resolution 1s core hole x-ray spectroscopy in 3d transition metal complexes - Electronic and structural information", *Coord. Chem. Rev.* **249** 65-95 (2005).