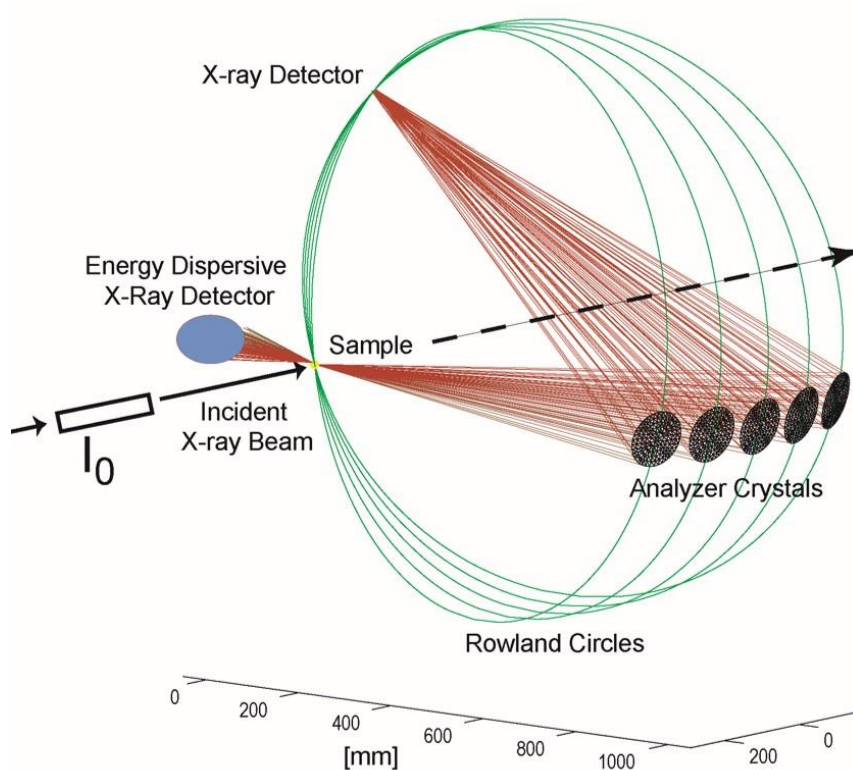


## Photon-in/photon-out spectroscopy

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X-ray absorption spectroscopy (XAS) for element-selective chemical and magnetic characterization is a standard technique in all fields of natural sciences. XAS probes unoccupied electronic levels and far more can be learned about the sample with information also on the occupied levels. Analysis of the X-rays emitted from the sample in a second order optical process (XES, RIXS) provides this information and photon-in/photon-out spectroscopy is realized in more and more experimental stations. Instrumental improvements with respect to energy resolution, detection efficiency and usability have extended the range of applications from solid state physics to materials science, coordination chemistry, biology, cultural heritage, earth and environmental sciences. Importantly, the growing amount of experimental data is supported by better theoretical tools for their analysis and interpretation. The presentation will briefly explain the theoretical basis, outline different experimental setups and present examples that illustrate possibilities and limitations of photon-in/photon-out spectroscopy.



### References:

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