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## A wavelength-dispersive spectrometer for resonant inelastic X-ray scattering

*Tuesday 16 September 2025 17:00 (1 hour)*

Conventional X-ray techniques often lack the energy resolution, the efficiency or the polarization sensitivity required. In collaboration with the NIST the PTB has developed a new wavelength-dispersive spectrometer (WDS) capable of high-resolution XES and RIXS in the photon energy range from 80 eV to 1500 eV. The WDS finds its main applications in the investigation of low Z compounds and battery material research, the validation and development of theoretical calculation tools, and the accurate determination of x-ray fundamental parameters\*. The innovative design is based on a modified Hettrick-Underwood geometry and is equipped with sets of variable line spacing (VLS) gratings and related spherical mirrors allowing for efficient collection and diffraction of X-rays\*\*, \* \* \*. In addition, the perpendicular dual detection arms enable simultaneous measurements in different orientations to the polarization plane of the incident synchrotron radiation. The incident monochromatized undulator radiation is focused down to a 7  $\mu\text{m}$  spot size using a single-bounce monocapillary X-ray optics. A position-sensitive CCD camera is used as a detector in each arm.

### Footnotes

\* B. Beckhoff, Nanomaterials 12 (2022), 2255

\*\* S. Dörfler, H. Althues, P.Härtel, T. Abendroth, B. Schumm and S.Kaskel, Joule 4, 539–554 (2020)

\* \* \* K. J. Kim, M. Balaish, M. Wadaguchi, L. Kong and J.L.M. Rupp, Adv.Energy Mater. 11, 2002689 (2021)

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