European XFEL

European XFEL Science Seminar

Tuesday, 16th April 2019, 13:00
Campus Schenefeld, XHQ, room E1.173

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Balanced Detection for XAS at the Photon Noise Limit

Despite being a ubiquitous method at storage ring x-ray light sources the development of soft x-ray XAS at FELs has been sluggish. My talk will begin with a survey of why this method is challenging for such high intensity pulsed sources. Building on this experience we use diffractive optics to divide a monochromatic soft x-ray beam into two identical copies. Using this balanced approach where one beam copy illuminates the sample, the other copy serves as a reference and both are detected on a CCD—we demonstrated XAS limited only by the number of photons detected. We successfully applied this method to time resolved XAS on VO_2 near the metal to insulator transition. This method will unlock new possibilities for XAS at FELs to study: dilute systems, subtle processes and nonlinear phenomena.

Host: Robert Carley