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Opportunities and challenges in the era of superluminous lightsources

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In the last 15 years there has been a spectacular rise of large data volumes acquired in X-ray diffraction experiments. In 2006, around the time I started my PhD, the world's first soft X-ray free-electron laser, FLASH in Hamburg, was collecting diffraction patterns at roughly 1 Hz. Nowadays we're collecting data at the European XFEL at a peak rate into the megahertz.

This has enabled the development of new techniques which exploit this richness and were not possible before. At the same time this has brought enormous challenges to a community that had relatively little experience handling such large data quantities.

In this talk I will present the evolution of coherent X-ray imaging, and in particular ultrafast X-ray diffractive Imaging experiments, and discuss what new techniques might be over the horizon and how to best make use of this wealth of data to extract as much new knowledge as possible.

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