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How AI Is Changing the Ways Experiments Are Conducted at Synchrotron Light Sources

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Synchrotron light sources have been developing rapidly since the 1980's when first dedicated light source facilities started operations. These light sources essentially extend our human vision and allow us to see and investigate tiny things from microstructures to molecules and atoms, in many cases in-situ and under operating conditions. Such research activities have made substantial scientific and technological impacts on energy, microelectronics, quantum information, synthesis and manufacturing, human health, and the environment.

In recent years, data science and the use of artificial intelligence (AI) and machine learning (ML) have been recognized as critical part of running experiments at synchrotron facilities. This field is developing rapidly, leading to fundamental changes in how certain experiments are being conducted at synchrotron beamlines. In this talk, I will present some examples of this new development trend at National Synchrotron Light Source II (NSLS-II), and how potentially such development will change how experiments are conducted at synchrotrons.

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