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Data Processing for the Linac Coherent Light Source

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The increase in velocity, volume, and complexity of the data generated by the upcoming LCLS-II upgrade presents a considerable challenge for data acquisition, data processing, and data management. These systems face formidable challenges due to the extremely high data throughput, hundreds of GB/s to multi-TB/s, generated by the detectors at the experimental facilities and to the intensive computational demand for data processing and scientific interpretation. The LCLS-II Data System offers a fast, powerful, and flexible architecture that includes a feature extraction layer designed to reduce the data volumes by at least one order of magnitude while preserving the science content of the data. Innovative architectures are required to implement this reduction with a configurable approach that can adapt to the multiple science areas served by LCLS. In order to increase the likelihood of experiment success and improve the quality of recorded data, a real-time analysis framework provides visualization and graphically-configurable analysis of a selectable subset of the data on the timescale of seconds. A fast feedback layer offers dedicated processing resources to the running experiment in order to provide experimenters feedback about the quality of acquired data within minutes. We will present an overview of the LCLS-II Data System architecture with an emphasis on the Data Reduction Pipeline (DRP) and online monitoring framework.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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