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Simulation package for the Beam Synchrotron Radiation Longitudinal density monitor (BSRL)

The Beam Synchrotron Radiation Longitudinal density monitor (BSRL) at the LHC leverages time-correlated single-photon counting to provide high-dynamic-range measurements of particle populations within each bunch in the LHC including monitoring of "ghost"and "satellite"bunches, which represent charge captured in nominally empty buckets, thereby enhancing the accuracy of luminosity calibration. To further improve BSRL performance and assess the impact of hardware modifications and data processing adjustments on measurement accuracy, we are developing a simulation package of the BSRL. This will allow for in-depth analysis and optimization of this complex device.

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