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Status and performance of LumiBelle2 in the 2024 beam operation of SuperKEKB

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LumiBelle2 is a fast luminosity monitoring system designed to do fast luminosity feedback and machine tuning and beam parameters studies for SuperKEKB. It uses sCVD diamond detectors placed in both the electron and positron rings to measure the Bhabha scattering process at vanishing photon scattering angle. Two types of online luminosity signals are provided, Train-Integrated-Luminosity signals at 1 kHz as input to the dithering feedback system used to maintain optimum overlap between the colliding beams in horizontal plane, and Bunch-Integrated-Luminosity signals at about 1 Hz to check for variations along the bunch trains. Vertical beam sizes and offsets can also be determined from collision scanning. This paper will describe the design of LumiBelle2 and report on its performance in the 2024 beam operation of SuperKEKB.

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