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Grid Disturbance Rejection via Improved DC-Link Voltage Feedforward Control for L-Bend Power Supplies in the APS Upgrade

Wednesday 13 August 2025 16:00 (2 hours)

As part of the Advanced Photon Source Upgrade (APS-U), two high-power DC supplies for the L-Bend M1 and M2 magnets were installed. During the APS-U commissioning, a 1 Hz ripple was detected in the output currents of the M1/M2 and slow corrector supplies, leading to 1 Hz beam motion. This low-frequency harmonic originated from the booster ramping supply operating at 1 Hz, causing periodic grid voltage sags. This paper proposes an improved DC-Link voltage feedforward control for the M1/M2 supplies to reject grid disturbances, significantly attenuating the 1 Hz and other low-frequency ripples in the output currents. Combined with regulation circuit modification of the slow corrector power supplies, the 1 Hz harmonic was successfully eliminated from the beam motion.

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No

Footnotes

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Yes

Author: RUAN, Yang (Argonne National Laboratory)

Co-author: RAFAEL, Fernando (Argonne National Laboratory)

Presenters: RAFAEL, Fernando (Argonne National Laboratory); RUAN, Yang (Argonne National Laboratory)

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