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Status of longitudinal bunch-by-bunch feedback system at the upgraded Advanced Photon Source

Monday 11 August 2025 16:00 (2 hours)

The upgraded Advanced Photon Source (APS) is using twelve Radio Frequency (RF) cavities from the original APS RF system to compensate for beam energy loss. Undamped higher order modes (HOMs) from these cavities pose a risk of instability under the new APS conditions. Dimtel iGp12 processor-based bunch-by-bunch Longitudinal Feedback (LFB) system is developed to address longitudinal coupled-bunch instabilities caused by HOMs. These instabilities are exacerbated by the reduced synchrotron frequency and faster growth rates in presence of bunch lengthening system. The mitigation strategy involves initially reducing growth rates through precise cavity temperature tuning, followed by employing the LFB system to effectively manage residual growth rates. Resonance cavity temperatures of the HOMs have been characterized under APS conditions, providing a reference for tuning in the upgraded APS operation. The LFB system is designed to operate in both phase and energy sensing modes. This paper presents the feedback configuration, initial commissioning results with phase and energy sensing modes, and the feedback setup for operations.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

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Yes

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