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(G*) POS-C13 – Analyzing Growth/Damp curves in the Canadian Light Source storage ring

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The Transverse Feedback system at the Canadian Light Source can identify, categorize, and mitigate against periodic instabilities that arise in the storage ring beam. By quickly opening and closing the feedback loop, previously mitigated instabilities will be allowed to grow briefly before being damped by the system. The resulting growth in the beam oscillation amplitude curve can be analyzed to determine growth/damp rates and modes of the coupled bunch oscillations. Grow/damp curves will be collected and analyzed for various storage ring beam properties, including beam profile density, beam energy, machine chromaticity, injection instability, insertion device gap width, or bunch fill patterns. These results will be used to characterize the known instability growth rates, and search for unknown instability modes that may cause stability problems in the future. The instability analysis in the CLS will also impact the design of future insertion devices that might be added for new beamlines and the design of the CLS2 ring which is being planned.

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