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Vibration-based condition monitoring of a lead screw in the mirror positioning unit on the CIRI beamline

Wednesday 17 September 2025 17:00 (1 hour)

A newly constructed infrared (CIRI) beamline at the SOLARIS National Synchrotron Radiation Centre features a front-end mirror positioning system capable of inserting the mirror directly into the storage ring vacuum chamber. The positioning mechanism utilizes a lead screw drive, which recently experienced a mechanical failure during operation. To enhance reliability and enable early fault detection, a vibration-based condition monitoring strategy is being implemented. The approach employs an industrial accelerometer mounted on the mirror assembly to measure vibration signals during insertion and extraction cycles. These signals are analysed to assess the operational condition of the lead screw and to identify early indicators of mechanical degradation, supporting predictive maintenance and reducing the risk of unexpected failures. The presentation will cover the concept, implementation, and results obtained from vibration-based monitoring, with particular emphasis on improving system reliability.

Footnotes

Funding Agency

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