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The observer-based estimation of photon beam position for improved beamline stability at SPS

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This paper presents the development and implementation of an observer-based estimation method to determine the photon beam position for various beamlines at the Siam Photon Source (SPS). The research addresses position drift issues, especially in beamlines without installed photon Beam Position Monitor systems (pBPMs). The method provides real-time estimates of photon beam positions, which are then used as inputs for the SPS's central control system to improve beamline stability. Initial tests indicated a position stability improvement of over 30%, significantly enhancing the reliability of experiments. This observer-based approach provides a cost-effective solution by eliminating the need for additional pBPM installation in space-constrained beamlines while maintaining an error margin of less than 10% between estimated and measured positions. This innovation is essential for enhancing the operational stability of existing beamlines and offers a scalable model for similar applications in the future.

Footnotes

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