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Data fusion based on the symmetric dual-path laser uncertainty weighting method

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The construction of fourth-generation accelerators, represented by free-electron lasers and diffraction-limited storage rings, is increasingly popular, which sets higher standards for the installation precision of insertion devices. Large-scale insertion devices are installed using two laser trackers, but a rigorous system has not been established. To enhance installation accuracy, we propose a symmetric uncertainty weighting fusion method. This method integrates the data from two laser trackers with uncertainty weighting through symmetric coordinate transformation, thereby establishing a dual-route laser system. According to actual measurement and simulation results, it has been proven that this method can effectively improve the precision of coordinate system recovery, reduce deviations from theoretical values, and thereby enhance installation precision.

Footnotes

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