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Studies on Virtual Platform for the HALF Beamline

The autonomous alignment and optimization of synchrotron beamlines pose significant challenges. Traditionally, manual alignment is time-consuming and experience-dependent process, often requiring extensive diagnostic efforts and data collection. With the construction of the Hefei Advanced Light Facility (HALF) underway, the development of a virtual platform for beamlines will be an invaluable tool for beamline scientists and users. This platform will enable software testing and improve the prediction of optical element parameters in advance. In this paper, we present the development and comprehensive study of a virtual platform representing beamline BL10 at HALF. Additionally, we explore the integration of an AI-driven control system for optical elements control of synchrotron radiation beamlines within the virtual platform.

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