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Precise Magnet Alignment for SPring-8-II and Beyond

Precise magnet alignment based on a vibrating-wire method has been developed for the storage ring of an upcoming fourth-generation light source, SPring-8-II. All the multipole magnets in each straight section placed on a common girder will be aligned with an accuracy of ±0.005 mm or better with magnetic centers detected by the wire outside the machine tunnel before the installation. The same alignment procedure has been successfully applied to Japan's newly launched compact 3 GeV light source, NanoTerasu. Based on the magnetic centers measured by the vibrating wire method, we also discuss a correlation between the magnetic centers and the mechanical bore centers of multipole magnets. An innovative vibrating wire method to align magnet arrays containing permanent magnets is proposed for future accelerators. Proof-of-principle experiments and feasibility studies are underway. The proposed scheme and preliminary results will be presented at the workshop.

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