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Towards fiber optics-guided synchrotron radiation-based longitudinal beam diagnostics at the KARA booster synchrotron

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Before injection into the Karlsruhe Research Accelerator (KARA), the electron storage ring of the KIT Light Source, the beam energy is ramped up from 53 MeV to 500 MeV by a booster synchrotron. The whole booster is located in a concrete enclosure inside the storage ring and thus not accessible during operation. For the study of longitudinal beam dynamics, a cost-effective solution to leverage the synchrotron radiation emitted at the booster bending magnets is desired. To ensure durability of the setup and to not obstruct the removable concrete ceiling of the booster enclosure, it is required to place the radiation-sensitive readout electronics outside of the booster enclosure and outside of the storage ring. In this contribution a fiber-optic setup consisting of commercially available optical components, such as collimators, optical fibers and high bandwidth photodetectors is used. As a proof-of-concept we present experimental results of different components characterized at the visible light diagnostics port of the storage ring KARA. In addition, we report on first booster measurements along with planned future experiments.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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