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Magnetic field optimization for HTS Staggered Array Undulator samples

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A high-temperature superconducting (HTS) undulator is under development at the Paul Scherrer Institut. This device equipped with HTS bulks is a novel technology to generate short period and high strength magnetic field. For medium-energy synchrotron storage rings, this is a promising option to increase tremendously the photon flux in hard X-ray domain. The experiment for a sample consisting of 20 HTS bulks gave an encouraging result above 1.9 T magnetic field of 10-mm period at 4-mm magnetic gap. Nevertheless, the peak-to-peak fields are not homogeneous enough to ensure the corresponding photon beam quality. A magnetic optimization method of sorting and shimming is presented together with the simulation of the resulting optimized field.

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