

Calculation of the Dynamic Aperture in the ANKA Storage Ring with a High-field Wavelength Shifter,

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Karlsruhe - Super-conducting split-pair solenoids are an attractive and commercially available solution for a high field wavelength shifter provided their nonlinear field contributions do not spoil the electron optics. We present third-order tracking calculations concerning the influence of a 12 Tesla split-pair solenoid used as a wavelength shifter in the 2.5 GeV synchrotron light source ANKA. Particles are tracked using MARYLIE. The Lie map representing the nonlinear field of the split-pair solenoid is calculated by means of NIN/SCB and then read into MARYLIE. The influence on the emittance is calculated by means of DIMAD. The results show that the dynamic aperture is only slightly reduced by the split-pair solenoid if the linear optics is appropriately chosen. Emittance blow-up is also tolerable. In this way the hard edge of the photon spectrum can be moved significantly towards higher photon energies which opens up new applications in several fields such as tomography, fluorescence, or absorption analysis.