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Applications of horizontal field damping wiggler in the diffraction limited storage ring

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In this study, we present a lattice design for the dif-fraction limited storage ring (DLSR), achieving an ultra-low natural emittance of 25.6 pm rad (N-IBS). To address the significant intra-beam scattering (IBS) effect resulting from the ultra-low emittance and long damping times, Horizontal Field Damping Wigglers (HFDWs) have been adopted. These components de-crease damping times and beam horizontal emittance while generating vertical emittance, thereby achieving a "round beam" in the 864mDLSR. Using theoretical analysis and accelerator toolbox simulations, the op-timal peak field, period length, and overall length of the HFDWs for the 864mDLSR have been determined. In addition, the linear optical corrections were per-formed on both the front and rear units of the HFDWs using six quadrupoles.

Footnotes

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