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Tue-Mo-Po2.04-07 [21]: Design and Optimization of Eddy-Current Type Thin Septum Magnet for Beam Injection of Diffraction Limited Storage Ring

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Fast kickers such as strip-lines along with lambertson magnet or thin septum magnet could support on-axis injection for Diffraction Limited Storage Ring (DLSR), in which traditional off-axis injection becomes inadequate. This paper focuses on the designing, manufacturing and process optimization of thin septum magnet. The scheme of eddy-current type thin septum magnet (the thinnest portion is with the thickness of 0.6mm) was adopted with laminated silicon steel sheets as magnet core. Firstly, theoretical analysis and calculating about magnet parameters was conducted. Then the simulation of main field and leakage field along the beam trajectory, the stray field decayed over 1millisecond time had been carried out within Opera 2D/3D. Besides, special attention was paid to compare and analyze of various shielding and insulating materials, leakage field suppression methods and optimize structure of septum to satisfy the physical requirement that the integral leakage field is less than 0.1% with respect to the main one. The work laid a foundation for injection technology of advanced light source.

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