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Longitudinal gradient bending magnet(LGBM) permanent magnet for Korea-4GSR Project

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A 4th generation storage ring based light source is being developed in Korea since 2021. It features <60 pm rad intrinsic beam emittance, about 800 m circumference, 4 GeV e-beam energy, full energy booster injection, and more than 40 beamlines which includes more than 24 insertion device (ID) beamlines. To optimize the beam emittances, longitudinal gradient bending magnet is applied in the storage ring design. The initial design was using conventional electrical excitation, but the design is changed to use permanent magnet (Sm₂Co₁₇) to minimize energy costs. In this report, the physics design and prototyping is described including field integral, field tuning, and temperature compensation scheme.

Footnotes

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