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Presentation

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Design of Dipole Magnets for Siam Photon Source II

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Two types of dipole magnets are designed for the storage ring of Siam Photon Source II, the second synchrotron light source in Thailand. Magnetic field at the magnet center is 0.87 T, which bends a 3.0 GeV electron beam with the bending radius of 11.532 m and consequently the synchrotron radiation is generated. The first type of dipole magnet is a standard dipole with the magnet gap of 36 mm. The other type is designed for Infrared (IR) beamline with the larger magnet gap of 59 mm to accommodate a wide opening angle of IR radiation. The magnets are designed such that the applied operating current is the same while the turn number of magnet coils and the magnet gap are allowed to be different. Therefore, a single power supply can be used to excite all dipole magnets in the storage ring which will be connected in series. Magnet modelling and magnetic field calculation of dipole magnets are performed in Opera-3D. The magnet poles are shimmed near the edges to improve magnetic field homogeneity to be within the requirement of 2×10^{-4} within the good field region. Mechanical analysis of magnet structure is performed in SOLIDWORKS and ANSYS where the maximum deformation of 18 - 23 micrometers is found at the magnet pole and the first-mode natural frequency is higher than 200 Hz.

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