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# Mechanical analysis of quadrupole magnets for the 3 GeV storage ring of Siam Photon Source II

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Quadrupole magnets for the 3 GeV storage ring of Siam Photon Source II (SPS-II) focus and defocus the electron beam according to the lattice design. This work investigates the impact of fabrication errors on the magnetic field of quadrupole magnets. Magnetic field simulations in Opera-3D show that misalignment and assembly errors lead to unwanted multipole components. Mechanical analysis was performed on two quadrupole magnet structures: Type A, with two removable poles for coil insertion, and Type B, with no removable poles and four symmetric pieces. ANSYS Workbench was used for static structural simulation. The material used is AISI 1006 low-carbon steel. Results showed maximum deformation at the magnet poles in both types. Detailed analysis and comparison with prototype measurements will be discussed to validate the magnet design and simulation for future manufacturing for the SPS-II Project.

## Footnotes

## Funding Agency

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