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Tue-Af-Po2.18-10 [41]: Optimization Design of CiADS Superconducting Solenoid

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Accelerator Driven System (ADS) is recognized as one of the most efficient ways to transmute minor-actinides. China initiative Accelerator Driven System (CiADS) project as ADS demonstration with 500 MeV has been approved in 2015. Three type superconducting focusing solenoids are used to focus and correct beam in CiADS superconducting LINAC. The focusing solenoid includes a solenoid coil and a pair of steering dipoles. It is required to produce high focus strength and low stray field near superconducting RF cavity in a limited space according to beam physics requirements. It is difficult to design the solenoid using a commercial magnetic field simulation program. Self-developed Solenoid optimization code base on OpenMDAO toolkit was used to design the solenoid. Nonlinear optimization method was used for the solenoid coils to meet the requirement of focusing strength and stray field with minimized solenoid volume. This paper presented the optimization design of the solenoid.

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