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## Wed-Af-Po.09-01: Startup of a multi-physics simulation platform for fusion magnet design and analyses

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For advancing the development of fully superconducting tokamak magnets and accelerating the progress to the next step in fusion reactor DEMO design, a refined and integrated large-scale superconducting tokamak simulation platform is being developed in China. The aim is to optimize the design and performance of tokamak magnets, improve their efficiency and reliability, solve complex multi-physics R&D problems, and improve the efficiency of design workflows involving macroscopic and detailed analysis. In pursuit of the ultimate goal, the software being developed not only integrates several secondary development interfaces to commercial software but also codifies a set of codes covering macro and detailed scientific issues, such as stability analysis, quenching, etc. The platform will incorporate separate design modules for electromagnetic, thermal, mechanical, and thermo-hydraulic while allowing for multi-module coupling to meet optimization and transient multi-physics coupling demands. The developed module will be cross-checked with the corresponding experiments and the material database will be integrated at the same time. Creating an effective user interface and workflow is also under consideration, while the scalability and maintainability of the software to support future developments and updates will be discussed. It is believed that the tool will bring benefits to designers.

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