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Design of the Superconducting undulator for EuPRAXIA@SPARC_LAB

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EuPRAXIA@SPARC_LAB is a new Free Electron Laser (FEL) facility that is currently under construction at the Laboratori Nazionali di Frascati of the INFN. Fermilab is contributing to the project with the design, manufacturing and qualification of a prototype conduction cooled superconducting undulator (SCU) that, if successful, could be integrated in the final machine.

The design of the SCU capitalizes on the extensive experience present at Fermilab on cryomodules. Specifically, the system is based on the warm strongback concept developed for the PIP-II project which enables a modular design with multiple undulator coils integrated in a single vacuum vessel. This publication focuses on the overall design concept of the magnet system, its modularity, cost reduction potential and industrialization strategy.

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