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## Cryogenic DC/DC converter for superconducting magnet applications

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Superconducting magnets have been attracting research interest due to their numerous applications, which include accelerator magnets, fusion magnets and superconducting trains. However, as the coils driving the magnets require large currents, the losses in the current leads supplying the coils can be problematic. Power semiconductor devices have shown improved performance at cryogenic temperature as their conduction and switching losses generally decrease at lower temperatures. In this paper, a cryogenic DC/DC converter is proposed to be placed between the current leads and the magnet to reduce the current passing through the leads by stepping down the voltage locally and acting as a transformer, thus reducing the transmission losses and the overall losses of the system. The paper will address the design, simulation and experimental testing of a converter for driving a superconducting magnetic coil. Finally, the overall efficiency will be measured with and without the converter, and a comparison and analysis will be carried out.

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