Cryogenic challenges for different superconductive motor topologies

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Numerous studies and prototypes have proven the potential benefit of superconducting material being used in motors and generators. The electromagnetic system used in the motor or generator offers already for normal conductive systems a large variety of topologies, with the superconductor being introduced completely new compositions can be realized. This presentation will give an overview of selected rotor and stator topologies being suitable for integrating superconducting material to improve the performance. The specific requirements of each system will be discussed, focusing on the potential application range. Besides the electromagnetic layout it is also important to completely integrate necessary cryogenic components into the motor or generator. Depending on the topology the specifications for the cryogenic components will be listed and characteristical constraints are mentioned. Complementary to the theoretical discussion of the topologies some representative demonstrators of the past will be selected and presented.