# Simulation analysis of Thyristor Dual-converter for coil power supply systems in fusion devices


## *Abstract*

This project focuses on the design and simulation analysis of a Thyristor Dual-Converter for driving the high-inductance superconducting/copper coils in fusion devices. Fusion magnets require precise, four-quadrant control of DC current to manage the plasma's shape and position, necessitating a power supply capable of both sourcing and absorbing energy. A simulation model is developed using MATLAB/Simulink (or PSIM) to evaluate the converter's performance. The model features two back-to-back thyristor bridge rectifiers configured for various operational requirements. This setup allows for seamless reversals of coil current and voltage, critical for stabilizing plasma during rapid transients.The control philosophy needs to be established for voltage and current management as per the reactor operational requirements. Results shall demonstrate the dual-converter's ability to provide high current stability and low ripple, even under the extreme inductive loads typical of tokamak systems.


## Academic Project Requirements:

**1) Required No. of student(s) for academic project: 1**

**2) Name of course with branch/discipline: B.E./B.Tech. Electrical**

**3) Academic Project duration:**

**(a) Total academic project duration: 10 Weeks**
**(b) Student's presence at IPR for academic project work: 3 Full working Days per week**


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