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Thermal Analysis and Simulation of the Superconducting Magnet in the SpinQuest Experiment at Fermilab

Tuesday, 24 September 2019 14:40 (20 minutes)

The SpinQuest experiment at Fermilab aims to measure the Sivers asymmetry for the $\bar{u}$ and $\bar{d}$ sea quarks in the nucleon using the Drell-Yan process. The experiment will use a 5 T magnet, a ^{4}He evaporation fridge with a large pumping system and 140 GHz microwaves to produce transversely polarized NH_3 and ND_3 targets. The proposed beam intensity is 1.5×10^{12} of 120 GeV proton/sec. A quench simulation in the superconducting magnet is performed to determine the maximum intensity of the proton beam before the magnet transition to the resistive state. In this presentation a GEANT based simulation used to calculate the heat deposited in the magnet is discussed and the subsequent cooling processes which are modeled using the COMSOL Multiphysics are presented.

Summary

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