Thermal simulations of cryogenic quantum sensors for new physics searches

Contact: Leendert Hayen (hayen@lpccaen.in2p3.fr)

INTRODUCTION

ASGARD is a novel proposed experiment using superconducting quantum sensors coupled to the new DESIR facility at GANIL for searches for Beyond Standard Model physics. Its detectors will be operated in a windowless dilution refrigerator (around 100mK) coupled directly to a room temperature isotope beam line, which presents significant thermal engineering challenges for this pioneering effort. Together with ion beam transport studies, the optimal geometry and mode of operation are not yet well-defined.

DESCRIPTION OF THE WORK

The student will contribute to the thermal simulation study of the proposed ASGARD experiment and interface directly with ion beam transport simulations. The combination will be used to inform the final design of the dilution refrigerator and its coupling to DESIR's radioactive beam line. This information will be studied hand in hand with the manufacturer and the involved engineers.