

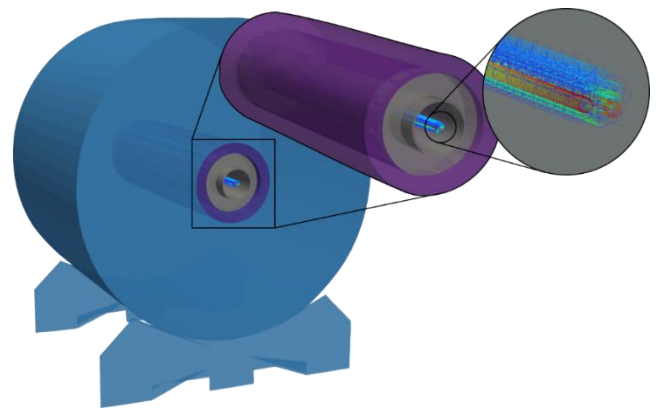
Master Thesis/Diplomarbeit

Electron energy spectroscopy for a measurement of correlation coefficients in neutron β -decay

14. December 2020

The PERC (Proton Electron Radiation Channel) instrument, a collaboration between the Neutron & Quantum Physics Group of the Atominstitut, the University of Heidelberg, the Technical University of Munich and the Institute Laue-Langevin in Grenoble, will perform precision measurements of angular correlations in neutron beta decay. It is designed to improve the sensitivity of neutron decay studies by one order of magnitude.

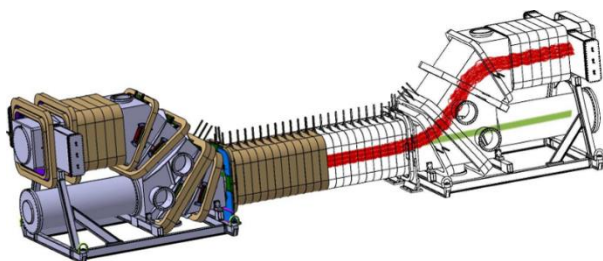
Within the framework of PERC, we are building the Beta-Frequency experiment, a novel idea for a detector measuring electron energy. In this detector, the energy of electrons is not measured via absorption in a calorimeter, but via the cyclotron radiation emitted by electrons in a magnetic field.



Topics for a master thesis in the area of neutron β -decay include:

- R&D of a magnetic trap for non-destructive electron decay spectroscopy
- Development of the magnetic field homogenization control system using superconducting shim coils

During the course of the thesis, you will learn the procedures to operate a superconducting magnet, handle cryogenics (liquid nitrogen and helium), as well as operate high current sources in order to charge superconducting coils



Possible start date of the thesis:

Winter 2021

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