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Radiation Shielding Calculations for the PERC Magnet

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The free neutron decay offers an extensive test field for the Standard Model of Particle Physics. Several measurable correlation coefficients between the neutron and its main decay particles, protons and electrons, can be tested against the Standard Model description of this decay.

The PERC experiment, currently being assembled at the white neutron beam line MEPHISTO at the FRM II in Garching, is capable to measure these correlation coefficients with a high precision. The experiment is a 12 m long superconducting magnet which separates the electrical charged particles of the decay from the incoming neutron beam with a tunable magnetic field. The charged particles are measured outside of the magnet, the neutrons have to be stopped inside the magnet.
The neutron beam stop together with the decay volume are sources of unwanted radiation outside of the experiment. This radiation must be minimized by design of the beam stop or additional shielding.

The Author presents the status of the shielding calculation based on these conditions.

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