

Measuring the neutron electric charge with time-of-flight grating interferometry

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Neutron grating interferometers can be employed as powerful tools to perform high-precision measurements of deflection angles and scattering. A novel concept of a symmetric Talbot-Lau interferometer using three identical absorption gratings in a time-of-flight mode is under development at the University of Bern. The ultimate goal of this project is to conduct a sensitive measurement of the neutron electric charge and to improve the current best upper limit : $Q_n < (-0.4 \pm 1.1) \cdot 10^{-21} e$ [Baumann, 1988]. A proof-of-principle apparatus has been characterized at the cold neutron beamline PF1b at the Institute Laue-Langevin in Grenoble, France. A description of the experiment, alignment procedures and first results concerning beam deflections measurements, the setup stability and the neutron electric charge will be presented

Author: PERSOZ, Marc

Presenter: PERSOZ, Marc

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