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Vacuum Magnetic Birefringence & Axion search using pulsed magnetic fields

We propose to combine state of the art optical instrumentation with very high pulsed magnetic fields to study magneto-optical phenomena in the quantum vacuum, i.e. the experimental proof of the magneto-optical properties of quantum vacuum.

Our goal is to realize the first ever measurement of the linear magnetic birefringence of vacuum which corresponds to a variation in the velocity of light depending on its polarisation in the presence of transverse magnetic field.

The study of photon propagation inside a transverse magnetic field can also test physics beyond the standard model. In particular, photons in a magnetic field are predicted to oscillate into weakly interacting massive particles (WIMPs), such as the axion. The VMB setup that is proposed in this submission will also make an important contribution to the search for axions.

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Track Classification: Dark matter and dark sector (accelerator and non-accelerator dark matter, dark photons, hidden sector, axions)