

General relativity experiment with frozen spin rings

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In a recent paper (<https://doi.org/10.1088/1361-6382/aacfee>), a general relativistic (GR) calculation was presented on the Earth's gravitational effect in a mixed magnetic-electric frozen spin storage ring on the spin transport. It was shown that GR causes a precession out of the orbital plane in a frozen spin ring, i.e. a slow vertical polarization buildup will be present, given that the initial beam polarization was longitudinal. The rate of the vertical polarization buildup is predicted to be $-\frac{a\beta\gamma g}{c}$, where g is the gravitational acceleration on the surface of the Earth, c is speed of light, $\beta\gamma$ is the particle momentum over mass, and a is its magnetic moment anomaly. It is seen that the effect increases unboundedly with the Lorentz factor γ . Moreover, is proportional to the magnetic moment anomaly a . The talk shall mainly address the experimental perspectives to detect this GR effect.

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