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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 -a*betagamma*g/c, where g is the gravitational acceleration on the surface of the Earth, c is speed of light, betagamma 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 gamma. 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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