

# JOINT PARTICLE & STATISTICAL PHYSICS SEMINAR

February 13th, 2019.

Wednesday, 14.15

ELTE TTK Northern Building 2.54

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## **General Relativity experiment with spin polarized particle beams**

In experimental proposals published in the last two decades, a so called frozen spin storage ring concept emerged, for setting upper experimental bounds to electric dipole moment (EDM) of charged elementary particles with spin. In a recent paper of ours (Class.Quant.Grav.35(2018)175003), a fully covariant general relativistic (GR) calculation was presented on the Earth's gravitational modification effect on the spin transport inside such a frozen spin storage ring. It turns out that in certain configurations, Earth's gravity is expected to produce a similar order of magnitude effect as the aimed EDM sensitivity, and thus it becomes kind of realistic to experimentally see this GR effect. If such an experiment could be conducted, it could provide a novel test of GR: with microscopic particles, at relativistic speeds, along non-geodesic (forced) trajectories, and the tensorial nature of GR would be at test, not merely the gravitational drag. In more technical terms: the GR correction to the so called Thomas precession could be tested in lab. For details on the experimental idea, we refer to: arXiv:1901.06217 (Proceedings of Spin2018 Conference).

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**Room 2.54**

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