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Charge radius determination via bound electron g-factors (REMOTE)

Monday 28 July 2025 17:30 (40 minutes)

The gyromagnetic g-factor of bound electrons in highly charged ions is ideal for testing quantum electrodynamics (QED) in the strongest electric fields. Additionally, the bound electron g factor is significantly influenced by the nuclear properties due to the close vicinity of the electrons to the nucleus. This allows the extraction of high precision nuclear charge radii. The ALPHATRAP experiment is a dedicated cryogenic Penning-trap setup to measure these bound electron g-factor of single HCIs. By co-trapping two hydrogenlike neon ions (20Ne9+ and 22Ne9+) we have determined their isotope g-factor shift with 13 digits precision in respect of g. This allows to test the QED recoil contribution to highest precision and to improve the isotopic mean square nuclear charge radius difference by a factor of eight compared to the literature value. Furthermore, we set limits on hypothetical new physics beyond the standard model. I will present recent studies and future prospects.

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