

# The electric dipole moment of an electron in H-like ions in an electric storage ring.

Friday, 22 June 2012 14:00 (20 minutes)

Theoretical studies are presented how the Electric Dipole Moment (EDM) of the electron in H-like ions in electric storage rings can be sensitively determined. The investigation follows the recent proposals to measure the muon EDM [1], the nuclear EDM [2] and the electron EDM in H-like Highly Charged Ions (HCI) [3] in magnetic storage rings, as well as the proposals to measure muon, proton and deuteron EDMs in electric storage rings [4]. The basic idea in [4] was that the electric field should compensate the centrifugal force and the injected particles would move along the closed trajectory in the ring. In the applied electric field of the order  $10^5$  V/cm and the velocity of the ions  $0.1 c$  we obtain for different ions the radii of the trajectory of the order of few meters. The electron EDM in the H-like ions is strongly (up to  $10^4$ ) enhanced. With the proposed experiments new constraints of about  $10^{-28}$  -  $10^{-30}$  e cm for the electron EDM can be established what is few orders of magnitude more restrictive than the existing boundaries.

## References

- [1] Y.K. Semertzidis, in Proc. of the Workshop on Frontier Tests of Quantum Electrodynamics and Physics of the Vacuum, Sandansky, Bulgaria (1998)
- [2] I.B. Khriplovich, Phys. Lett. B 444, 98 (1998)
- [3] A. Bondarevskaya, A. Prozorov, L. Labzowsky, G. Plunien, D. Liesen and F. Bosch, Phys. Rep. 507, 1 (2011)
- [4] Y.K. Semertzidis, AIP Conf. Proc. 1149, 48 (2009)

**Primary author:** Ms BONDAREVSKAYA, Anastasia (St. Petersburg State University)

**Co-authors:** Mr PROZOROV, Anton (St. Petersburg State University); Prof. LIESEN, Dieter (GSI Helmholtzzentrum für Schwerionenforschung mbH); Ms CHERNOVSKAYA, Evgenia (St. Petersburg State University); Prof. BOSCH, Fritz (GSI Helmholtzzentrum für Schwerionenforschung mbH); Dr PLUNIEN, Günter (TU Dresden); Prof. LABZOWSKY, Leonti (St. Petersburg State University); Dr ANDREEV, Oleg Yu. (St. Petersburg State University)

**Presenter:** Ms BONDAREVSKAYA, Anastasia (St. Petersburg State University)

**Session Classification:** Fri 14:00-15:30