Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Theoretical study of heavy-atom molecules to search for physics beyond the Standard model[1] A.N. PETROV, L.V. SKRIPNIKOV, A.D. KUDASHOV, N.S. MOSYAGIN, A.V. TITOV, Petersburg Nuclear Physics Institute, Gatchina, Leningrad district 188300 and Dept. of Physics, Saint Petersburg State University, Petrodvoretz 198504, Russia — The goal of the report is to review our latest studies for heavy-atom diatomics - ThO, RaO, RaF, PbF - which are of practical interest to search the T, P-odd effects. Particular attention is devoted to the $H^3\Delta_1$ state of ThO [1, 2]. Combination of the spin precession measurement of ThO [3] with the calculated E_{eff} (ThO) [1] leads to the most rigid limit on eEDM:, $|d_e|<8.7 \times 10^{-29}$e·cm. This is more than one order of magnitude better than other limits obtained. The knowledge of the g-factor dependence on electric fields is important for understanding possible systematic effects. Our study of the g-factors for $H^3\Delta_1$ has shown that the J = 2 rotational state should be even more robust against a number of systematic errors compared to J = 1 [2]. [1] L. V. Skripnikov, A. N. Petrov, and A. V. Titov, JCP Communication, **139**, 221103 (2013) [2] A.N. Petrov, L.V. Skripnikov, A.V. Titov, N.R. Hutzler, P.W. Hess, B.R. O'Leary, B. Spaun, D. DeMille, G. Gabrielse, and J.M. Doyle, *Phys. Rev. A* **89**, 062505 (2014) [3] J. Baron, W. C. Campbell, D. DeMille, *et al.* (ACME Collab.), *Science* **343**, 269 (2014)

[1]This work is supported by the SPbU Fundamental Science Research grant from Federal Budget No. 0.38.652.2013, RFBR Grant No. 13-02-01406. L.S. is also grateful to the President of RF grant no MK-5877.2014.2.

Svetlana Kotochigova
Temple University

Date submitted: 29 Jan 2015 Electronic form version 1.4