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HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION
THEORY CENTER

Seminar

Fermionic Schwinger effect in 1+3 dimensional de Sitter spacetime (in English)

SPEAKER : Dr. Takahiro Hayashinaka (RESCEU)

DATE : January 26th (Thur.) 15:30 ~

PLACE : Kenkyu Honkan 1F Meeting Room 1

We explored Schwinger effect of spin 1/2 charged particles with static electric field in 1+3 dimensional de Sitter spacetime [1]. The vacuum expectation value of the spinor current which is induced by the produced particles in the electric field was analytically calculated. We find that the current becomes negative, namely it flows in the direction opposite to the electric field, if the electric field is weaker than a certain threshold value depending on the fermion mass, which is also known to happen in the case of scalar charged particles in 1+3 de Sitter spacetime. We also investigated the implications of the result in detail.

References

[1] T. Hayashinaka, T. Fujita and J. Yokoyama, JCAP 1607 (2016) 07 010, arXiv:1603.04165

[2] only a partial list of recent works on the subject: T. M. B. Frob, J. Garriga, S. Kanno, M. Sasaki, J. Soda, T. Tanaka, and A. Vilenkin, JCAP 2014 (2014) 04 009, R. G. Cai and S. P. Kim, JHEP 09 (2014) 072, T. Kobayashi and N. Afshordi, JHEP 2014 (2014) 10 1-36, C. Stahl, E. Strobel, and S. S. Xue, Phys. Rev. D 93 (Jan, 2016) 025004, E. Bavarsad, C. Stahl, and S. S. Xue, arXiv:1602.0655, C. Stahl and S. Xue Phys.Lett. B760 (2016) 288-292, T. Hayashinaka and J. Yokoyama, JCAP 1607 (2016) 07 012, arXiv:1603.0617

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