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Breaking of adiabatic invariance in the production of particles by strong fields

Tuesday, 6 July 2021 11:50 (15 minutes)

Particles are spontaneously created from the vacuum by time-varying gravitational or electromagnetic backgrounds. It has been proven that the particle number operator in an expanding universe is an adiabatic invariant. In this talk we show that, in some special cases, the expected adiabatic invariance of the particle number fails in presence of electromagnetic backgrounds. In order to do this, we consider as a prototype a Sauter-type electric pulse. Furthermore, we also show a close relation between the breaking of the adiabatic invariance and the emergence of the axial anomaly. This talk is based on the paper Phys. Rev. **D** 100, 085014 (2019).

Primary authors: BELTRÁN-PALAU, Pau (University of Valencia); NAVARRO-SALAS, Jose (University of Valencia-IFIC (CSIC)); FERREIRO, Antonio (University of Valencia & IFIC); PLA GARCIA, Silvia (University of Valencia - IFIC)

Presenter: BELTRÁN-PALAU, Pau (University of Valencia)

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