

# Gravitational backreaction effect of Schwinger pair production in a strong electric field in de Sitter spacetime

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## Abstract

In this paper, a massive charged scalar field in a uniform strong electric field background in a de Sitter spacetime of arbitrary dimension has been considered. Using Bogoliubov coefficients, we obtain the semiclassical energy-momentum tensor of the Schwinger pairs in the strong electric field limit. We have shown that the trace of the semiclassical energy-momentum tensor vanishes. We have found that the nonvanishing components of the semiclassical energy-momentum tensor increase by a power of the electric field. Our results of the semiclassical energy-momentum tensor would be important for discussing the gravitational backreaction effect of the Schwinger pair production. We have shown that the Hubble constant decays and the time scale of the decay decreases by a power of the electric field.

**Keywords:** Scalar field, de Sitter spacetime, Schwinger effect, Semiclassical energy-momentum tensor, Gravitational backreaction

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