Contribution ID: **2** Type: **not specified**

High Temperature Effects in the Cosmic Gravitational Microwave Background

Thursday 7 December 2023 11:45 (12 minutes)

The thermal plasma in the early universe produced a guaranteed stochastic gravitational wave (GW) background, which peaks today in the microwave regime and was dubbed the cosmic gravitational microwave background (CGMB). The CGMB spectrum encodes fundamental information about particle physics and gravity at ultra high energies. In particular, one can determine from the CGMB spectrum the maximum temperature of the universe and the effective degrees of freedom at the maximum temperature.
In previous works only single graviton production processes that contribute to the CGMB have been considered. In this talk I show that graviton pair production processes can also yield a significant contribution to the CGMB spectrum if the ratio between the maximum temperature and the Planck mass, $T_{\rm max}/m_{\rm p}$, divided by the internal coupling in the heat bath is large enough.
In addition I discuss how quantum gravity effects appear in single graviton production processes and are smaller by a factor $(T_{\rm max}/m_{\rm p})^2$ than the leading order contribution.

Primary authors: SPERANZA, Enrico (University of Illinois at Urbana-Champaign); GHIGLIERI, Jacopo; SCHUETTE ENGEL, Jan (UC Berkeley)

Presenter: SCHUETTE ENGEL, Jan (UC Berkeley)

Session Classification: Theory