## Phenomenology 2021 Symposium



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## **Gravitational Waves as a Big Bang Thermometer**

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There is a guaranteed background of stochastic gravitational waves produced in the thermal plasma in the early universe. Its energy density per logarithmic frequency interval scales with the maximum temperature which the primordial plasma attained at the beginning of the standard hot big bang era. It peaks in the microwave range, at around 80 GHz  $[106.75/g_{*s}]^{1/3}$ , where  $g_{*s}$  is the effective number of entropy degrees of freedom in the primordial plasma at the maximum temperature. We present a state-of-the-art prediction of this Cosmic Gravitational Microwave Background (CGMB) for the case of the Standard Model (SM) as well as for several of its extensions. Furthermore, we discuss the current upper limits on the CGMB and the prospects to detect it in laboratory experiments and thus measure the maximum temperature and the effective number of degrees of freedom at the beginning of the hot big bang.

## Summary

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