

## NEW PERSPECTIVES IN CONFORMAL FIELD THEORY AND GRAVITY

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## Induced gravitational waves and baryon asymmetry fluctuations from primordial black hole formation

*Wednesday 27 September 2023 16:20 (20 minutes)*

We consider black hole formation due to the gravitational collapse produced by large density fluctuations during an epoch of reheating with a stiff equation of state, and calculate the corresponding signal in the induced gravitational wave spectrum. By considering the existing Big Bang nucleosynthesis and CMB bounds on the total energy density of gravitational waves today, we find the corresponding constraints on the parameter space of this scenario. We also calculate the lepton asymmetry generated at the perturbative level via the chiral gravitational anomaly present in the Standard Model and find that, once this is converted to a baryon asymmetry via electroweak sphaleron processes, the large spectrum of scalar perturbations responsible for black hole formation induces an enhancement in the baryon asymmetry fluctuations on small scales.

### Summary

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**Session Classification:** Parallel Session Wednesday: Gravitational waves/phase transitions session

**Track Classification:** Cosmology & Astroparticle Physics