

Phenomenology 2022 Symposium: From Virtual to Real



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BBN Constraints on Gravitationally Produced Dark Photons

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Dark photons can be gravitationally produced from quantum fluctuations during inflation, and it can be more efficient compared to the freeze-in production. The decay of the dark photons around BBN would inject electromagnetic energy into the plasma and potentially disrupt the successful prediction of light element abundances by BBN. In this talk I will discuss MeV to GeV scale gravitationally produced dark photons decaying into Standard Model particles and constrain the pre-decay abundance imposing limits from BBN. I will show that depending on the Hubble rate at the end of inflation, gravitational production can rule out a much larger portion of the dark photon parameter space compared to the freeze-in production.

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