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## A global analysis of decaying ALPs

*Wednesday, 10 August 2022 16:50 (20 minutes)*

Axion-like particles (ALPs) decaying before the time of recombination can have strong implications in a range of cosmological and astrophysical observations. In this talk I present a global analysis of a model of decaying ALP, focusing specifically on their coupling to photons. Exploiting the multidisciplinary nature of the GAMBIT framework, we combine state-of-the-art calculations of the irreducible ALP freeze-in abundance, primordial element abundances (including photodisintegration through ALP decays), CMB spectral distortions and temperature anisotropies, and astrophysical constraints from supernovae and stellar cooling. Most notable among the interesting results that I will present are a definite lower bound on the ALP mass, and a surprising improvement of the fit to the primordial abundances compared to vanilla  $\Lambda$ CDM.

### Collaboration name

**Primary author:** Dr GONZALO, Tomas (RWTH Aachen)

**Presenter:** Dr GONZALO, Tomas (RWTH Aachen)

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