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## The Supercool Audible Axion

*Thursday 25 September 2025 16:30 (18 minutes)*

We present the audible axion mechanism extended by a period of supercooling that delays the onset of axion oscillations.

While the original setup relies on a large axion decay constant and coupling to a dark Abelian gauge field to produce sizable gravitational wave signals, in this talk we discuss how supercooling opens up the testable parameter space and reduces the required coupling to  $\alpha$

*gtrsim1*.

We further showcase that the emission of gravitational waves via the axion coupling to the Standard Model photon becomes possible, generating a strong signal in the  $\mu\text{Hz}$  or ultra-high frequency range. The main limitation for this scenario results from Schwinger pair production.

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