

# Tachyonic Instability Induced Gravitational Waves at the PTA and CMB

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When coupled to massless vector bosons, axion-like particles are known to generate a tachyonic instability as they start to roll down from the potential, which exponentially amplifies the vector boson wave functions. This drastic enhancement will in turn source gravitational waves that may be relevant for various experiments and observations. If the axion-like particles' rolling starts at a cosmic temperature of above MeV, the gravitational waves today will fall in the hunting range of pulsar timing arrays. Even the rolling starts much later, at after the cosmic recombination, the gravitational waves can still leave imprints on the polarizations of the cosmic microwave background. We will discuss the relevant model parameter space and the constraints in the corresponding scenarios.

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