

Whispers from the Dark Universe - Particles & Fields in the Gravitational Wave Era

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WHISPERS FROM THE DARK UNIVERSE – PARTICLES & FIELDS IN THE GRAVITATIONAL WAVE ERA

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Ultra-high Frequency Gravitational Waves from Scattering, Bremsstrahlung and Decay during Reheating

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Gravitational waves (GWs) present a promising avenue to probe the physics of inflationary reheating, which may play a crucial role in the thermal history of the early Universe. In this talk, I will discuss the unavoidable sources of GWs from graviton production during reheating. The processes under consideration include: *(i)* $1 \rightarrow 3$ graviton Bremsstrahlung, *(ii)* $2 \rightarrow 2$ scattering of the inflaton and its decay products, *(iii)* pure inflaton $2 \rightarrow 2$ scattering, and *(iv)* one-loop induced inflaton decay. Through a comprehensive comparison of these four sources of GWs, we will identify the conditions under which the dominant source emerges. Finally, I will comment on how future high-frequency detectors could potentially reveal the dynamics of reheating.

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