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Decay of acoustic turbulence and the resulting gravitational wave predictions

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For a wide range of scenarios, the generation of gravitational waves (GWs) from cosmological first-order phase transitions is believed to be dominated by sound waves. Understanding their decay through acoustic turbulence is an important factor in determining the overall intensity of the GW signal. We have simulated acoustic turbulence numerically in three dimensions to study its decay properties and apply them to estimate the resulting GW power spectrum. We find that including the decay leads to shallower power laws in the spectrum, with the predicted steep k^9 power law of the non-decaying case only appearing in the slow decay limit.

Author: DAHL, Jani

Co-authors: WEIR, David (University of Helsinki); RUMMUKAINEN, Kari; Prof. HINDMARSH, Mark (University of Helsinki, University of Sussex)

Presenter: DAHL, Jani

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