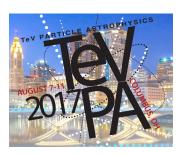
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Gravitational waves from bubble dynamics: Beyond the Envelope

Wednesday 9 August 2017 14:45 (15 minutes)

We study gravitational wave (GW) production from bubble dynamics

during a cosmic first-order phase transition

by using the method of relating the GW spectrum to the two-point correlation function $% \left(1\right) =\left(1\right) \left(1\right) \left($

of the energy-momentum tensor < T(x) T(y) >.

We adopt the thin-wall approximation but not the envelope approximation,

and take the (long-lasting) non-envelope parts into account by assuming free propagation after collision.

We first write down the analytic expressions for the spectrum,

and then evaluate them with numerical methods.

As a result, the growth and saturation of the spectrum are observed

as a function of the duration time of the non-envelope parts.

It is found that the IR region of the spectrum shows a significant enhancement

compared to the one with the envelope approximation,

growing from f^3 to f^1 in the long-lasting limit.

In addition, we find saturation in the spectrum in the same limit,

indicating a decrease in the correlation of the energy-momentum tensor at late times.

Our results are relevant to GW production from bubble collisions and sound waves.

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