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Bubble wall velocity and gravitational wave in the minimal left-right symmetric model

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The bubble wall velocity in the first order phase transition plays an important role in determining both the amplitude and the pivot frequency of stochastic gravitational wave background. In the framework of the minimal left-right symmetric model, we study the wall velocity when the first order phase transition can occur. The wall velocity can be determined by matching the distribution functions in the free particle approximation and the local thermal equilibrium approximation. It is found that the wall velocity can be determined in the range $0.2 < v_w < 0.5$ for the parameter space with the first order phase transition. It is also found that for the case when the wall velocity is close to the speed of sound, the peak amplitude of gravitational wave spectrum can be larger than that in the runaway case. Moreover, It is also found that there exists an approximate power law between the wall velocity and pressure difference between broken and symmetry phases, and the power index is equal to 0.41 or so.

Primary authors: Ms HUANG, Mei (University of Chinese Academy of Sciences); Mr YAN, Qi-Shu (University of Chinese Academy of Sciences, Beijing); 王, 典为 (中国科学院大学)

Presenter: 王, 典为 (中国科学院大学)

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