Dark Matter, Gravity and Cosmology

Project in French/German collaboration:

In preparation / preliminary

Towards gravitational waves from strong phase transitions with the Higgsless simulations

Chiara Caprini,[a,b] Ryusuke Jinno,[c] Thomas Konstandin,[d] Alberto Roper Pol,[a] Henrique Rubira,[e] Isak Stomberg[d]

We use a new hydrodynamic simulation scheme to study GW power spectra generated to during a first-order phase transition. We provide condensed information on the spectra as function of the wall velocity, latent heat, PT duration ...

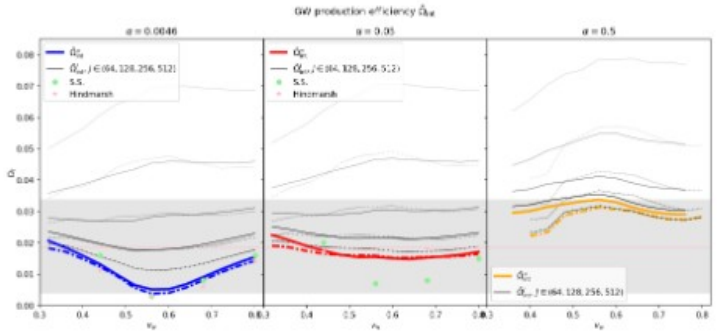

Figure 2. Gravitational wave production efficiency $\tilde{\Omega}^{sw}$ for weak (left), intermediate (middle) and strong (right) first-order phase transitions. Solid (dashed) lines are for box size 40 (20). Thin gray lines with increasing blackness correspond to increasing resolutions $J \in \{64, 128, 256, 512\}$, while thick colored lines are the extrapolated values to infinite resolution. The pink horizontal line is the average over all extrapolated values. The grey region marks the max-min range. Dots and stars mark the GW production efficiency as presented in table 2 and 3 of [5] corresponding to predictions from the Sound-shell model[?] and Scalar field - hydrodynamical simulations[?], respectively.

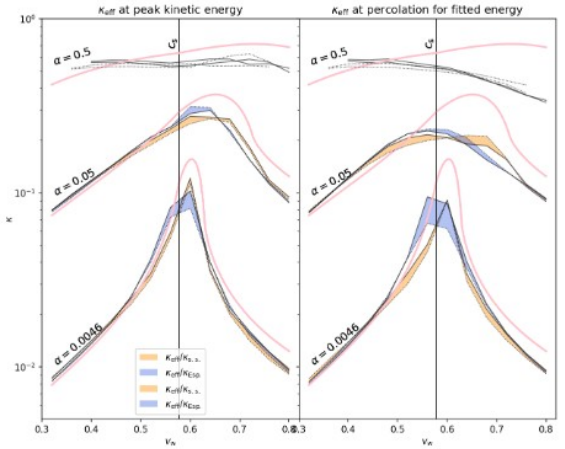

Figure 6. $\kappa_{\rm eff}$ evaluated at peak kinetic energy (left panel) and percolation for the energy fitted by a decaying power law (right panel). κ is taken to be either $\kappa_{\rm esp}$ (blue) or $\kappa_{\rm sum}$ obtained from single bubble simulations. Solid (dotted) lines are BS20(40). Pink lines indicate κ_{Esp}