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# Gravitational wave imprints of the doublet left-right symmetric model

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We study the strong first-order phase transition (SFOPT) associated with  $SU(2)_R \times U(1)_{B-L}$ -breaking in the doublet left-right symmetric model (DLRSM), and the resulting stochastic gravitational wave (GW) background. For different values of the symmetry-breaking scale  $v_R = 20, 30$ , and  $50$  TeV, we construct the one-loop finite temperature effective potential to explore the parameter space for SFOPT. We identify the region where the associated GW signature is detectable at planned GW observatories. A strong GW background favors a relatively light CP-even neutral scalar  $H_3$ , arising from the  $SU(2)_R$  doublet. The  $SU(2)_L$  subgroup of DLRSM is broken by three  $vevs$ :  $\kappa_1$ ,  $\kappa_2$ , and  $v_L$ . We observe a preference for  $\mathcal{O}(1)$  values of the ratio  $w = v_L/\kappa_1$ , but no clear preference for the ratio  $r = \kappa_2/\kappa_1$ . A large number of points with strong GW signal can be ruled out from precise measurement of the trilinear Higgs coupling and searches for  $H_3$  at future colliders.

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