

## Testing leptogenesis at the LHC and future muon colliders: a $Z'$ scenario

If the masses of at least two generations of right-handed neutrinos (RHNs) are near-degenerate, the scale of leptogenesis can be as low as  $\sim 100$  GeV. In this work, we study probing such resonant leptogenesis in the  $B\bar{B}L$  model at the LHC and future multi-TeV muon colliders via the process  $Z' \rightarrow NN \rightarrow l\pm l\pm + \text{jets}$ , with  $Z'$  the  $U(1)_{B-L}$  gauge boson and  $N$  the RHN. The same-sign dilepton feature of the signal makes it almost background-free, while the event number difference between positive and negative leptons is a hint for CP violation, which is a key ingredient of leptogenesis. We found that resonant leptogenesis can be tested at the HL-LHC for  $M_{Z'}$  up to 12 TeV, while at a 10 (30) TeV muon collider the reach can be up to  $M_{Z'} \sim 30$  (100) TeV via the off-shell production of  $Z'$ .

### Presentation type

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