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L-R neutrino oscillation during preheating

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When the Higgs field starts oscillation after Higgs inflation, gauge bosons will be produced non-perturbatively near the Enhanced Symmetry Point (ESP). Just after the particle production, when the Higgs field is going away from the ESP, gauge bosons gain mass and decay or annihilate into Standard Model (SM) fermions. In that way, left-handed neutrinos can be generated from the heavy gauge bosons. If one assumes see-saw mechanism, the mass matrix of a pair of left and right-handed neutrinos is non-diagonal. Although their mixing in the mass eigenstates is negligible in the true vacuum, it could be significant near the edge of the Higgs oscillation. Therefore, if the gauge bosons are transferred into left-handed neutrinos near the edge, there will be “neutrino oscillation” between the left and the right-handed neutrinos. Leptogenesis from this mechanism is briefly examined. If the idea is applied to mu-MSSM, the initial condition for the Hot Big Bang is totally different.

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