

## Emissivity of Neutrinos in Supernova via the Process $e^+e^- \rightarrow \nu\bar{\nu}$ in a 331 Model

We calculate the emissivity due to neutrino-pair production via the process  $e^+e^- \rightarrow \nu\bar{\nu}$  in the context of a 331 model in a way that can be used in supernova calculations. We also present some simple estimates which show that such process can act as an efficient energy-loss mechanism in the shocked supernova core. We find that the emissivity is almost independent on the mixing angle  $\phi$  of the model in the allowed range for this parameter.

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