# Leptogenesis

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Generating baryons in the Universe requires violation of the conservation of baryon number. The most popular idea studied for some time was to invoke the grand unification of particle interactions. Actually, baryon number is violated, in principle, even within the Standard Model of particle physics, owing to quantum fluctuations. This effect was conceived to be only academic, since it is suppressed by a huge exponential factor, making it too small to cause any effects in nature. It was eventually realised, however, that this suppression is lifted at a temperature above the electroweak scale. This, at the same time, was a bad news to grand unification baryogenesis: baryon number generated, which equals lepton number, is all erased.

One idea to save the situation is to generate lepton number in an earlier universe. This is a natural possibility if neutrinos are massive and of the Majorana type. Decay of superheavy Majorana neutrinos produces lepton number, which is converted partially to baryon number when the Universe was above the electroweak energy scale. It is now conceived that the scenario should work if the neutrino mass is 0.1eV or less.