THE ELECTRON NEUTRINO MASS

These limits apply to ν_1, the primary mass eigenstate in ν_e. They would also apply to any other ν_j which mixes strongly in ν_e and has sufficiently small mass that it can occur in the respective decay. The neutrino mass may be of a Dirac or Majorana type; the former conserves total lepton number while the latter violates it. Either would violate lepton family number, since nothing forces the neutrino mass eigenstates to coincide with the neutrino interaction eigenstates. For limits on a Majorana ν_e mass, see the section on "Searches for Massive Neutrinos and Lepton Mixing," part (C), entitled "Searches for Neutrinoless Double-β Decay."

From the analysis of neutrino events from SN 1987A it is possible to get upper bounds on neutrino masses. For two examples of such studies, see Refs. 1 and 2 and references therein.

Our mass limit for ν_e is taken from the average in the ν_e "Mass Squared" section immediately below this section.

References

1. D.N. Spergel and J.N. Bahcall, Phys. Lett. **B200**, 366 (1988).
2. L.F. Abbott *et al.*, Nucl. Phys. **B299**, 734 (1988).