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Evidence for an Inverted Neutrino Mass Hierarchy from the T2K θ_{13} Result and ν-Process Nucleosynthesis[1] GRANT MATHEWS, University of Notre Dame, TOSHITAKA KAJINO, WAKO AOKI, NAOJ, WATARU FUJIYA, Univ. Tokyo — The synthesis of ^{11}B and ^{7}Li via neutrino-induced nucleon emission (the ν-process) is sensitive to the neutrino mass hierarchy if the θ_{13} mixing angle is large enough. This arises because, when there is significant 13 mixing, the average electron neutrino energy for the charged-current neutrino reactions is larger for a normal mass hierarchy than for an inverted hierarchy. This mixing occurs in the carbon shell and hence affects the nucleosynthesis of ^{11}B and ^{7}Li in the helium shell of core-collapse supernovae. Recent constraints on θ_{13} from the T2K collaboration indicates that indeed θ_{13} is large enough to induce substantial mixing. Moreover, there is also recent recent evidence from SiC X grains in meteorites for the existence of ν-process ^{11}B and ^{7}Li encapsulated in some grains. We show here that these two new results hint at a marginal (1σ) preference for an inverted neutrino mass hierarchy. The analysis of more X grains enriched in Li and B could substantially improve this limit.

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