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Novel matter effects on neutrino oscillations observables

In a recent article (arXiv:180306332) we noticed that the electron density in matter exhibit large spikes close to the atomic nuclei. We showed that these spikes in the electron densities, 3-4 orders of magnitude larger that those inside the Sun's core, have no effect on the neutrino emission and absorption probabilities or on the neurinioless double beta decay probability. However, it was not clear if the effect of these spikes is equivalent to that of an average constant electron density in matter. We investigated these effects by a direct integration of the coupled Dirac equations describing the propagation of flavor neutrinos into, through, and out of the matter. These results will be reported, including the effects of electron densities on the mixing amplitudes of the vacuum mass eigenstates.

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