Comparison of $\nu_\mu \to \nu_e$ Oscillation calculations with matter effects
MICHAEL GORDON, WALTER TOKI, Colorado State University — An introduction to neutrino oscillations in vacuum is presented, followed by a survey of various techniques for obtaining either exact or approximate expressions for $\nu_\mu \to \nu_e$ oscillations in matter. The method devised by Mann, Kafka, Schneps, and Altinok produces an exact expression for the oscillation by determining explicitely the evolution operator. The method used by Freund yields an approximate oscillation probability by diagonalizing the Hamiltonian, finding the eigenvalues and eigenvectors, and then using those to find modified mixing angles with the matter effect taken into account. The method developed by Arafune, Koike, and Sato uses an alternate method to find an approximation of the evolution operator. These methods are compared to each other using parameters from both the T2K and LBNE experiments.

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