

Time-energy uncertainty relation for neutrino oscillations in curved spacetime

Thursday, 13 June 2019 17:00 (25 minutes)

We derive the Mandelstam-Tamm time-energy uncertainty relation for neutrino oscillations in a generic stationary curved spacetime. In particular, by resorting to Stodolsky covariant formula of the quantum mechanical phase, we estimate gravity effects on the neutrino energy uncertainty. Deviations from the standard Minkowski result are explicitly evaluated in Schwarzschild, Lense-Thirring and Rindler (uniformly accelerated) geometries. Finally, we discuss how spacetime could affect the characteristic neutrino oscillation length in connection with the recent view of flavor neutrinos as unstable particles.

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