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Neutrino oscillations in Unruh radiation: the proton's testimony

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The study of the inverse beta-decay of accelerated protons ($p \longrightarrow n + e + \nu e$) recently provided a theoretical proof of the necessity of the Unruh effect in QFT.
Indeed, on the basis of the sole requirement of General Covariance of the formalism, it was found that the decay rates in the inertial and comoving frames are in agreement only when taking into account the thermal nature of the accelerated vacuum.
Such an analysis was then extended to the case of flavor mixing for the emitted neutrinos, leaving open the question of whether to consider mass or flavor neutrinos as fundamental (i.e asymptotic) states.
In the present analysis, we prove that the only scenario which is compatible with the General Covariance of QFT and naturally incorporates neutrino oscillations is the one build upon flavor eigenstates.
We further point out that the Unruh thermal bath must be made up of oscillating neutrinos.

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