Erratum: Spatial entanglement and massive neutrino oscillations produced by orbital electron capture decay [Phys. Rev. D 84, 073005 (2011)]

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In Sec. V, it was argued that, in the coincidence experiment, a recoil nucleus should oscillate with the oscillation length $L_{ij}^{n} = \alpha L_{ij}^{\nu}$, where L_{ij}^{ν} is the oscillation length of a neutrino. This is the misinterpretation of Eq. (55), which refers to an experiment with two detectors connected to a coincidence circuit with one output (the ‘‘and circuit’’).

This statement is readily illustrated by two-neutrino mixing (i.e. $\beta = e, \mu$),

$$|\nu_e\rangle = |\nu_1\rangle \cos\eta + |\nu_2\rangle \sin\eta, \qquad |\nu_\mu> = -|\nu_1\rangle \sin\eta + |\nu_2\rangle \cos\eta, \tag{1}$$

where η is the neutrino mixing angle. One can rewrite Eq. (55) in the form

$$\frac{dP_{e\beta}}{dr_n dr_\nu} = \frac{2F_{I'}L_n^2}{\pi^{3/2}DD_R^3(t)} \exp[-2\Gamma(t - L_\nu - L_n)]\mathcal{W}_{e\beta}\mathcal{W}_n, \tag{2}$$

where

$$\mathcal{W}_{ee} = 1 - \sin^2(2\eta)\sin^2[\pi(L_\nu + L_n)/L_0], \qquad \mathcal{W}_{e\mu} = \sin^2(2\eta)\sin^2[\pi(L_\nu + L_n)/L_0] \tag{3}$$

are well-known oscillation probabilities, $L_0 = 4\pi Q_{EC}/\Delta m^2$ $(\Delta m^2 = m_2^2 - m_1^2 > 0)$ is the oscillation length, and $\mathcal{W}_n = 1$ is the probability of a recoil registration. In a coincidence experiment, a signal disappearance at certain positions of the detectors N and R is caused by the oscillating probability $\mathcal{W}_{e\mu}$ in the muon neutrino channel. The recoil nucleus does not oscillate. To observe the spatial correlation and neutrino oscillations, one needs the correlation experiment, in which an experimental event involves the independent registration of a neutrino and a recoil nucleus in two detectors.

All other results reported in the paper remain unchanged.

