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Super weak force and origin of neutrino masses

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We consider an anomaly free extension of the standard model gauge group G_{SM} by an abelian group to $G_{SM} \otimes U(1)_Z$. The condition of anomaly cancellation is known to fix the Z -charges of the particles, but two. We fix one remaining charge by allowing for all possible Yukawa interactions the known left handed neutrinos and new right-handed ones that obtain their masses through interaction with a new scalar field whose vacuum is broken spontaneously. We discuss some of the possible consequences of the model and ways of constraining the parameter space.

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