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K to Pi nu nu and new physics in the neutrinos

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I discuss generic effects of new physics on the rare decay modes $K_L \rightarrow \pi^0 \nu \bar{\nu}$ and $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ from the point of view of the neutrino sector. I consider left-handed neutrino couplings; right handed neutrino couplings; neutrino lepton flavour violating (LFV) interactions; and $\Delta I = 3/2$ interactions. The first of these cases has been studied before as it covers many new physics extensions of the standard model; the second one requires the existence of a new light (sterile) right-handed neutrino and its contribution to both branching ratios is always additive to the SM. It is motivated as a possible solution to the so called charged B anomalies. The case of neutrino LFV couplings produces interesting constraints on CLFV modes such as semi-tauonic tau decay.

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