

Double-Beta Decay with Emission of Single Electron

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We study a new mode of the neutrinoless and two-neutrino double-beta decay in which a single electron is emitted from the atom. The other electron is directly produced in one of the available $s_{1/2}$ or $p_{1/2}$ subshells of the daughter ion. The neutrinoless electron-production mode $0\nu EP\beta^-$, which would manifest through a monoenergetic peak at the endpoint of the single-electron energy spectrum, is shown to be inaccessible to the future experiments. Contrary, its two-neutrino counterpart $2\nu EP\beta^-$ might have already influenced the single-electron spectra measured, *e.g.*, for the isotope ^{100}Mo in the experiment NEMO 3. We discuss the prospects for detecting these new modes also for other isotopes in the SuperNEMO upgrade.