

Abstract Submitted  
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**Neutron-induced background on natural tellurium relevant to  $^{130}\text{Te}$   $0\nu\beta\beta$  decay searches at CUORE and SNO+** WERNER TORNOW, SEAN FINCH, Duke University, MARY KIDD, Tennessee Tech University — Gamma-ray production cross-section data have been obtained for the reactions  $^{126,128,130}\text{Te}(n,n'\gamma)$  at five mean neutron energies between 3.5 and 10 MeV. We report data for the  $\gamma$ -ray energy region relevant to  $0\nu\beta\beta$  decay of  $^{130}\text{Te}$  with  $Q_{\beta\beta}$ -value of 2527.515 keV. For CUORE only the  $\gamma$ -ray transitions of excited states of  $^{130}\text{Te}$  at 2527.06 keV and of  $^{126}\text{Te}$  at 2533.85 keV are of interest. For SNO+ with its inferior energy resolution, additional excited state decays of  $^{130}\text{Te}$  levels at 2575.2, 2581.15, and 2607.33 keV, of  $^{128}\text{Te}$  levels at 2494.20, 2508.06, 2516.64, 2550.52, 2571.17, 2587.14, 2598.99, and 2630.14 keV, and of  $^{126}\text{Te}$  levels at 2496.83, 2503.55, 2577.822 and 2585.462 keV are important. The highest cross-section values were found for cascade  $\gamma$ -ray transitions to the ground state, while direct transitions to the ground state are very weak and have been observed only for  $^{130}\text{Te}$  at 2607.31 keV, for  $^{128}\text{Te}$  at 2508.04 keV, and for  $^{126}\text{Te}$  at 2503.32 keV. However, both the CUORE and SNO+ detectors may not be able to distinguish between cascade transitions to the ground state and direct transitions, making especially the neutron-induced excitation of the 2527.06 keV state of  $^{130}\text{Te}$  a potential problem for  $0\nu\beta\beta$  decay searches of  $^{130}\text{Te}$ .

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