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Level and life-time studies in odd-odd ^{202,204}Tl N. FOTIADES, R.O. NELSON, M. DEVLIN, LANL, J.A. BECKER, LLNL — The ^{203,205}Tl$(n, 2n\gamma)$ reactions were used to study excited states in odd-odd ^{202,204}Tl isotopes. The data were taken using the GEANIE spectrometer, a Compton-suppressed array of 26 Ge detectors. The pulsed neutron source of the Los Alamos Neutron Science Center's WNR facility provided neutrons in the energy range from 0.6 to 250 MeV. The time-of-flight technique was used to determine the incident neutron energies. Partial γ-ray cross sections were measured from the beam-on data while half-lives of isomers were determined from the beam-off data (typically, the half-lifes that can be currently measured with GEANIE vary between a few μs to a few ms). The level schemes of ^{202,204}Tl have been considerably enriched and extensive similarities observed between the two level schemes are discussed. The previously reported first excited state in ^{202}Tl has been decomposed into two close-lying states. In ^{204}Tl, the structure above the previously known 7^+ isomer (from the $\pi s_{1/2}\nu i_{13/2}$ configuration) at 1104-keV excitation energy has been established for the first time up to $E_x \sim$2.3 MeV, while, at higher excitation energies, a lower limit for the excitation energy of the $\pi h_{11/2}\nu i_{13/2}$ configuration is proposed. The half-lives of the 7^+ isomers of ^{202,204}Tl were measured with more precise results than the values adopted in the literature. This work was supported by the U.S. Department of Energy under Contracts No. DE-AC52-06NA25396 (LANL) and DE-AC52-07NA27344 (LLNL).

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