The Complete (n,gamma) Level Scheme of 124Te

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Recent investigations of Te isotopes using the (n,gamma) reaction by the Rez-Munich-Riga-Bucharest collaboration demonstrated that rather complete nuclear level schemes can be constructed. Also the level scheme of 124Te is complete up to 3 MeV (Georgii et al., Nucl.Phys.A592(1995)307). However, it is on the other hand still quite incomplete, because only 8% of the capture state depopulation and only 77% of the ground state population is observed. This is surprising and therefore a challenge for experimental nuclear physicists, since the neutron capture cross section of 123Te is very large (418b). Consequently we studied the 123Te(n,gamma)124Te reaction with gamma-gamma coincidences at the research reactor of Rez near Prague. Far more than 100 levels were established and most of the gamma transitions were placed in the level scheme. A statistical interpretation of this extensive level scheme is attempted.