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Title: Decay of  $^{101}\text{Mo}$  and  $^{101}\text{Tc}$

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The level structure of  $^{101}\text{Tc}$  and  $^{101}\text{Ru}$  have been investigated following the beta decay of 14.6 min  $^{101}\text{Mo}$  and 14.2 min  $^{101}\text{Tc}$ . A 35cm<sup>3</sup> Ge(Li) detector with 2.1 keV of resolution at 1332 keV was used in the singles experiments. The low energy portion of the spectrum was investigated with a Si(Li) detector. The radioactive sources of  $^{101}\text{Mo}$  were obtained by irradiating 5mg of enriched molybdenum metal (97%  $^{100}\text{Mo}$ ) for periods ranging from 1 to 10 min in the IEA-R1 research reactor at São Paulo (flux of  $\sim 10^{13}$  neutrons/cm<sup>2</sup>.s). A total of 22 sources were prepared in this work. The initial stage of the analysis was the identification of the  $\gamma$ -lines from both decays. In order to identify the origin of the gamma-rays, spectra were accumulated through five successive half-lives ( $\sim 75$  hours). The spectra of each half live was summed to achieve good counting statistics ( $\sim 27.5$  hours). The results of this analysis suggest more than 200 transitions detected in the two decays: 187 were assigned to the decay of  $^{101}\text{Mo}$ , 14 of them were observed for the first time and 31 to the decay of  $^{101}\text{Tc}$  have been confirmed. The energies and relative intensities of 218  $\gamma$ -rays have been determined with a better overall precision than previously. The energy of the levels were obtained through a least square fit using all  $\gamma$  transitions that could be ordered in the two decay schemes. On the basis of beta and gamma selection rules and log ft values, spin assignments have been suggested for a number of the levels.