## Precision Measurement of Transition and Level Energies in $^{233}U$

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Gamma ray energies in $^{233}U$ following the decay of $^{233}Pa$ were measured with the Risö bent crystal spectrometer. These gamma lines were detected during the study of the $^{232}Th(n,\gamma)^{233}Th$ reaction. Experimental details will be given elsewhere [1]. The energies were calibrated with the X-ray lines [2] and the annihilation line [3]. The energies of seven transitions between 270 and 420 keV were determined with an accuracy which is up to a factor of 10 better than previous measurements by ALBRIDGE, HOLLANDER, GALLAGHER, and HAMILTON [4]. The transition energies are shown in the level scheme [4, 5] (Fig. 1). A least squares program was used to fit the level energies to the seven transition energies obtained in this experiment and to four transition energies (below 103 keV) measured precisely by ALBRIDGE et al. [4]. Level energies could be calculated with an accuracy of about 20 eV (Fig. 1).

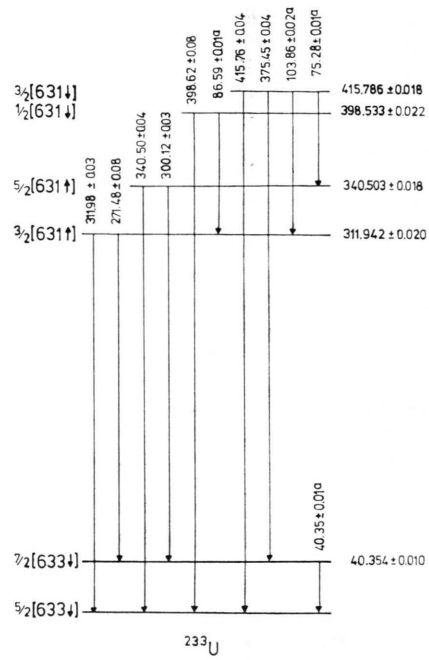


Fig. 1. Level scheme of $^{233}U$ (Energy in keV; [a] Energy from Ref. [4]).

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## Lifetime of the 23.8 keV state in $^{119}Sn$

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The half-life of the 23.8 keV state in $^{119}Sn$ has been remeasured by conversion electron- and X-ray-$\gamma$ delayed coincidence techniques. The result is $T_{1/2} = 18.45 \pm 0.2$ ns. The K-conversion coefficient of the 65 keV transition was measured as $\alpha_K = 1860 \pm 150$.

There is a discrepancy in the measurements of the half-life of the Mössbauer level in $^{119}Sn$. By X-ray-$\gamma$ delayed coincidence techniques, using NaI(Tl) detectors, OLSEN et al. [1] measured $T_{1/2} = 18.5 \pm 1$ ns, while LEJEUNE et al. [2] got $T_{1/2} = 22.4 \pm 0.5$ ns by the same technique and $T_{1/2} = 23.1 \pm 0.5$ ns from Mössbauer effect measurements. Lejeune et al. pointed out that small contaminations of the source can influence the measured half-life value. Recently BENCZER-KOLLER and FINK [3] published a remeasurement. Their value for the half-life is $T_{1/2} = 17.75 \pm 0.12$ ns.

In this work, the half-life has been measured using a $BaSnO_3$ source and a Sn-Pd alloy foil source (4.8 mg/cm² Sn-Pd, 18% Sn) with several coincidence circuits. A NaI(Tl) detector and a Ge(Li) detector were used for $\gamma$-ray and X-ray detection, and a fast gaseous parallel-plate avalanche counter (PPAC) [4, 5] for the detection of the conversion electrons from the 65 keV

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