K electron capture probabilties

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Electron capture probabilites (p_k) are important for nuclear structure , cosmology, nuclear medicine, and geochemistry. We have measured p_k values , hither to not available, in 18 nuclei. These include allowed and first forbidden beta transitions An x-gamma internal summing technique in a close geometry was employed . All these nuclei were produced by α induced reactions at the V ariable Energy Cyclotron, Calcutta. The thoretical formulae (Bambynek et.al)were used to determine the P_k values. The values thus obtained are compared with the theoretical values (Beherens and Janeke). The results results lead to the following conclusions. 1. The P_k values are insensitive to the $Q_{E.C}$ values except when $Q_{E.C}$ is less than 200 KeV 2. The measured values of p_k , ingeneral agree well with the Theory (beheren and Janek). Our latest measurements of p_k values for some nuclei are given in table 1.

Table.1.

Parent nucleus	reaction	Daughter E level KeV	transition energy KeV	P_k ex	P_k th
^{97}Ru	$^{94}Mo(\alpha,n)$	324.5	324.5 $5/2^+-5/2^+$	0.884 ±0.046	0.878
^{83}Rb	$^{81}Br(\alpha,2n)$	571.19	529.64 $5/2^--3/2^-$	0.877 ±0.024	0.885

References:

Bambynek W. et. al., Rev. Mod. Phys. 49(1977)77
Beherens H. and Janeke J., Numerical tables for β decay and ε , Vol 4., Landolt-Bornstein(Springer, Berlin, 1969)
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