Excited states of ^{126}Te

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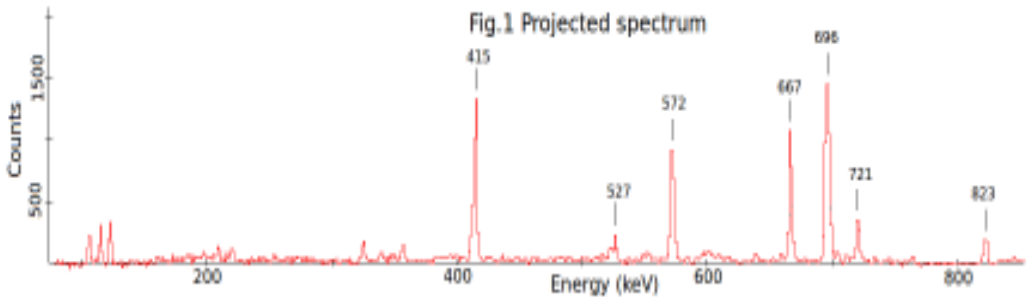
Many nuclei in the mass region ~130 *e. g.* ^{138}Gd, ^{136}Sm, ^{134}Nd, ^{132}Ce, ^{130}Ba, ^{128}Xe have been found in the literature to have K-isomers. We have chosen the nucleus ^{126}Te for studying K-isomerism. This nucleus is expected to have γ-soft behavior and may exhibit K-isomerism as predicted by Xu *et al*. [1]. The energy states up to $10\hbar$ have been identified in ^{126}Te [2]. Our plan was to build the level scheme first and then look for the isomer, if there is any. Here we present our experimental result on the excited states of ^{126}Te.

We performed an experiment in the Pelletron accelerator facility at the Inter University Accelerator Centre (IUAC), New Delhi. The experiment was optimized to populate ^{126}I using a ^{7}Li beam on a ^{124}Sn target at 50 MeV. In the same experiment, the nucleus ^{126}Te was also formed as another residue through the reaction ^{124}Sn(^{7}Li, p4n)^{126}Te. The experimental set-up, called INGA, consisted of 15 HPGe clover detectors, each surrounded by the BGO anti-Compton shield, was used. A self-supporting target of thickness 2.7 mg/cm^2 was utilized. The triple gamma coincidence data were collected at the rate of 3 kHz. The data were initially calibrated and gain matched. From the cube of E_γ - E_γ - E_γ, after background subtraction, the projected spectra for various double-gates were generated. Figure 1 shows an example of the projected spectrum with sum of many double-gates. This sum included all the pairs of coincident γ-transitions belonging to the band located at the extreme left of Fig. 2. The coincident gamma transitions belonging to ^{126}Te are labeled in Fig. 1. The new transitions are marked with a '*' in Fig. 2, and the tentative placement is shown with a dashed arrow. So far, we have placed 34 new transitions. The placement of many more transitions is currently underway. The spin and parity assignment will be done from the data analysis of Directional Correlation Ratios (DCO) and polarization.

References

[1] F.R.Xu *et al.,* Phys. Rev. C 59, 731(1999).
[2] C.T. Zhang *et al.,* Nuclear Physics A 628 386 (1998).



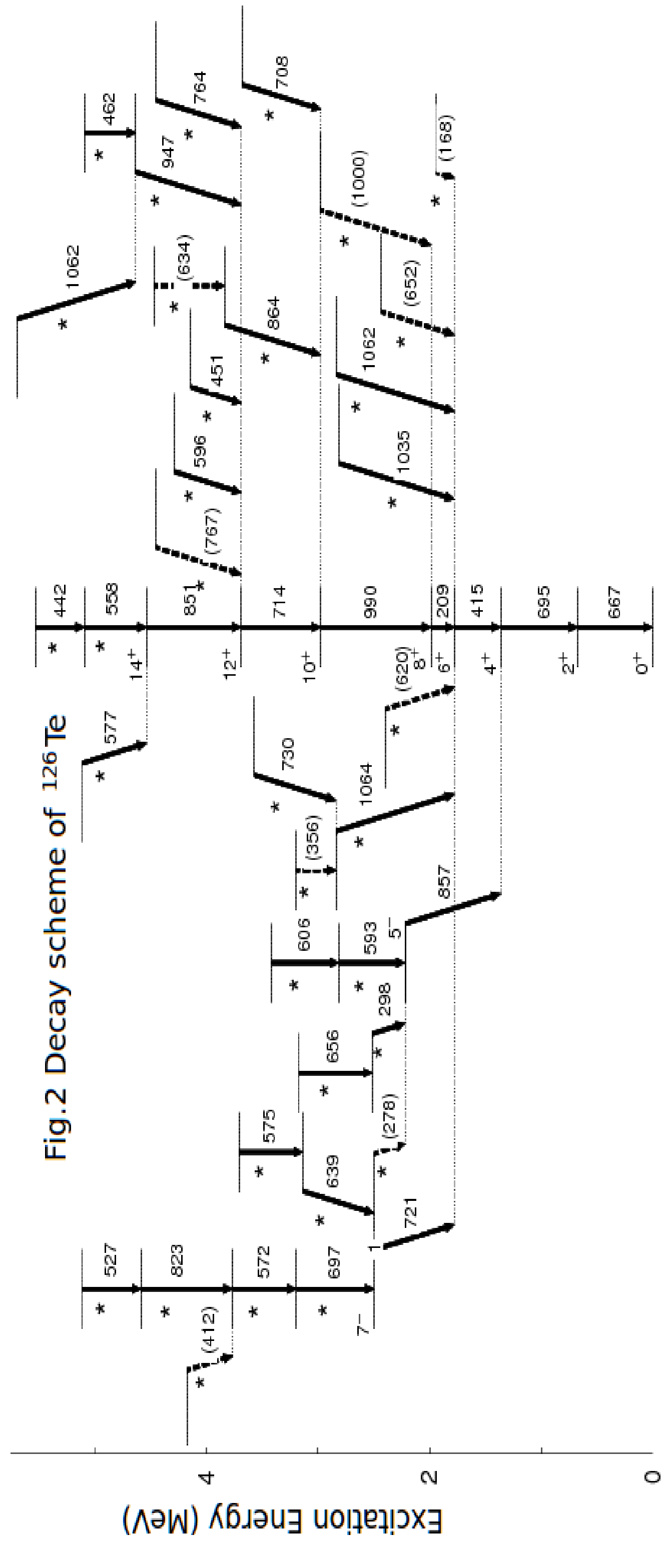


Fig.2 Decay scheme of ^{126}Te