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Lifetime studies of ^{133}Cs

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Nuclei in the A~130 region have been shown to demonstrate a variety of nuclear shapes. Indeed, previous work carried out by Koike et al. [1] has shown that the underlying physics of odd-odd Cs isotopes and neighbouring nuclei can be understood through a triaxial structure. Garg et al. [2] demonstrated that the behaviour of odd mass Cs nuclei, such as ^{133}Cs, can be well described by a combination of both the particle-plus-rotor and particle-plus-vibrator models. This is because Cs (Z=55) nuclei form an important link in the study of the region of transition between primarily vibrational Sn (Z=50) nuclei, and highly deformed La and Ce (Z = 57, 58) nuclei.

In order to better understand the low-lying structures of ^{133}Cs, an experiment was conducted at IFIN-HH, Bucharest to measure lifetimes in the picosecond to nanosecond regime. A 31.5 MeV beam of ^{7}Li, provided by the TANDEM accelerator, impinged on a ^{130}Te target to exploit the fusion evaporation channel, ^{130}Te(^{7}Li, 4n)^{133}Cs. Gamma-rays were detected using an array of 8 high-purity germanium (HPGe) detectors and 11 lanthanum bromide ($LaBr_3$) detectors. The latter providing the capability to measure lifetimes down to ~50 ps.

The level scheme of ^{133}Cs observed in this experiment will be compared with previous studies [1,2,3]. Transition strengths, determined from the measured lifetimes will be used to probe the low-lying structure in these nuclei. This presentation will give preliminary results of the analysis.

[1] T. Koike et al., Phys. Rev. C 67, 044319 (2003)
[2] U.Garg et al., Phys. Rev. C 19, 207-216 (1979)
[3] A.Raghav, R. Palit, et al., Proceedings of the International Symposium on Nuclear Physics (2009)