# BETA-STRENGTH FUNCTIONS FOR DECAY OF $11/2^-$-STATE IN $^{147m}$Tb, $^{149}_{67}$Ho, $^{151}_{67}$Ho AND SUPERFLUID CHARACTERISTICS IN Z=64, N=82 REGION

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The $^{146}_{64}$Gd nucleus exhibits some magic features due to closure of the neutron shell at N=82 and closure of the proton subshell at Z=64 /1/. The main feature of truly magic nuclei is the absence of the superfluid pairing due to a wide gap in the single-particle spectra. That is why an investigation of the superfluid characteristics of the nuclei around $^{146}$Gd is important for understanding whe-

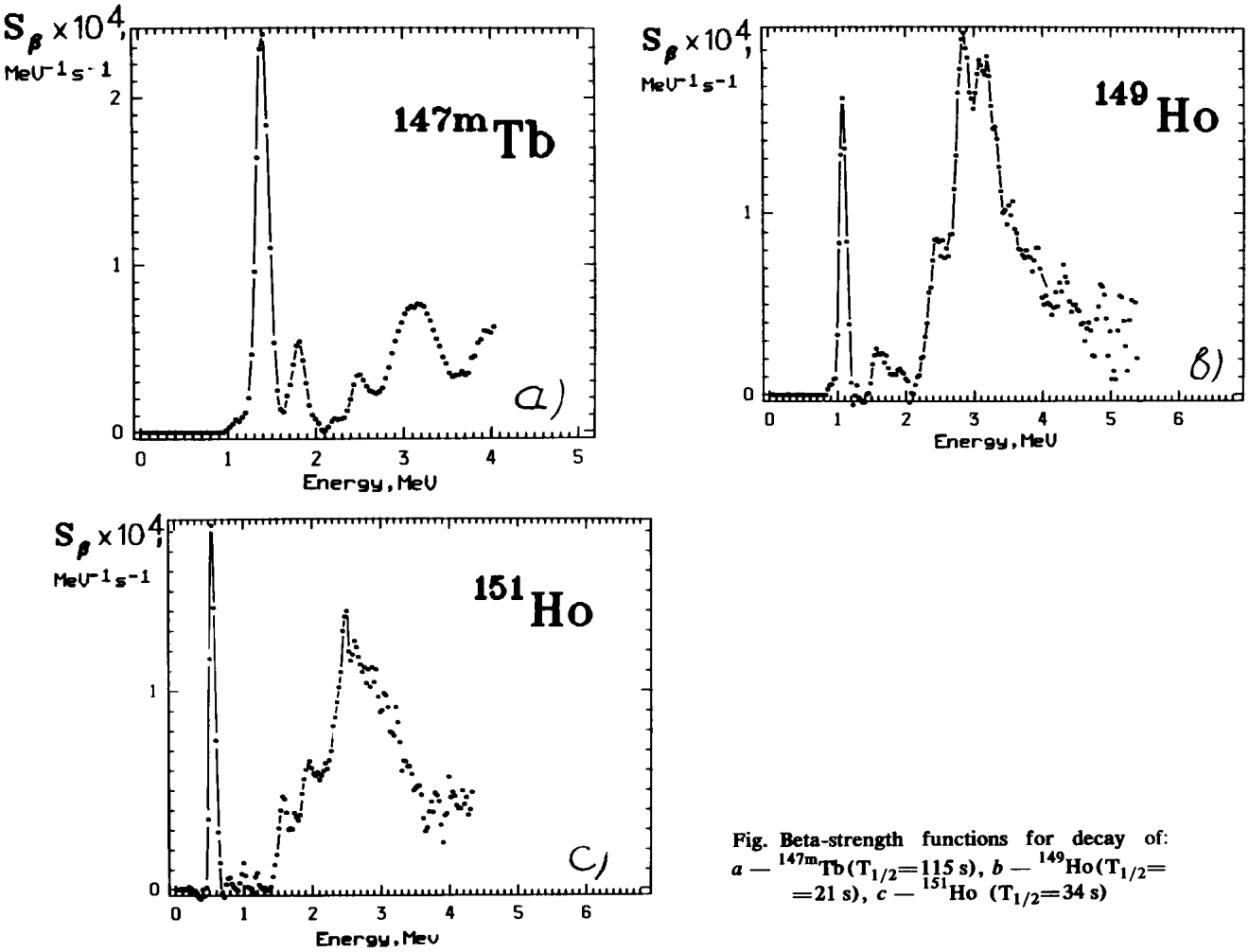


Fig. Beta-strength functions for decay of: *a* — $^{147m}$Tb($T_{1/2}$=115 s), *b* — $^{149}$Ho($T_{1/2}$=21 s), *c* — $^{151}$Ho ($T_{1/2}$=34 s)

ther the magic-like $^{146}$Gd nucleus is magic indeed. The study of β-strength functions $S_\beta$ for β-decay of $11/2^-$ states of N-even Z-odd nuclei around $^{146}$Gd is attractive in this respect since the $S_\beta$ are predominated by $\pi h_{11/2}$—$\nu h_{9/2}$ transition to either the 1 qp state $\nu h_{9/2}$ or the 3 qp states $\pi h_{11/2} \times$ $\times [\pi h_{11/2} \nu h_{9/2}]_{1^+}$ after the decoupling of a $0^+$-pair. So the superfluid characteristics may be deduced from the measurements of the β-strength distributions in a wide energy window. In our experiments, the radioactive sources were produced with the help of the IRIS mass-separator working on-line with the 1 GeV proton synchrocyclotron. Pure $^{147m}$Tb samples were obtained after collecting the α-recoil nuclei from the A=151 samples, a surface ionization ion source being used at the mass-separator. A selective laser ion source /2/ was used to extract Ho isotopes from the target. The beta strength functions shown in fig. *a-c* were obtained using the total γ-absorption technique /3/. The narrow resonances in the low energy region are to be attributed to the decay into the 1 qp state. The broad resonances in the high energy region are evidently due to the strongly fragmentated 3 qp states. Using the approach proposed in ref /3/, we get the values of the proton pairing correlation function $\Delta_p$ for the daughter nuclei $^{147}_{64}$Gd, $^{148}_{66}$Dy, $^{150}_{66}$Dy equal to 0.9 MeV, 1.2 MeV, 1,2 MeV, respectively. In view of this result, the magic-like nucleus $^{146}_{64}$Gd should be considered as a super-fluid Fermy system.

## REFERENCES


1. *Kleinheinz P. et al.* Z. Physik A290. 1975. 279.
2. *Alkhazov G. D. et al.* Preprint LNPI-1510. Leningrad, 1989. 10 p.
3. *Alkhazov G. D. et cl.* Preprint LNPI-1513. Leningrad, 1989. 24 p.