Coulomb excitation　　2015Ga38

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Huang Xiaolong, and Wang Xianghan	NDS 204,1 (2025)	30-Jun-2023

2015Ga38: ^{62}Fe beam was produced in-beam via the β-decay of ^{62}Mn. The ^{62}Mn beam was produced by bombarding a thick UC$_x$ target with a 1.4 GeV proton beam at REX-ISOLDE-CERN facility. The trapping and charge breeding times were varied to produce the ^{62}Fe beam via in-trap method. The final energy of the beam was 2.86 MeV/nucleon. A 4.0 mg/cm^2 thick ^{109}Ag target was used for safe Coulomb excitation. The scattered projectiles and the recoiling target nuclei were detected using a compact-disc shaped DSSSD placed 32.5 mm downstream from the target position. γ-rays were detected using HPGe detectors of Miniball array. Measured: scattered particles, recoiling target nuclei, Eγ, Iγ, $\gamma\gamma$-coin, (particle)γ-coin, (particle)(particle)-coin, (particle)$\gamma\gamma$-coin, Deduced B(E2) and quadruple moment of the first 2$^+$ state. Data analyzed using GOSIA2 which allows a simultaneous least-squares fit of matrix elements in the target and projectile systems.

Sub-barrier Coulomb excitation using 2.86 MeV/nucleon ^{62}Fe beam and ^{109}Ag target.

^{62}Fe Levels

E(level)	J$^\pi$	T$_{1/2}$	Comments
0.0	0$^+$		
877.3	2$^+$	5.7 ps *18*	Q=−0.08 *40* (2015Ga38) Q: from comparison of 877γ to GOSIA calculations, constrained by the T$_{1/2}$ measurements in 2011Ro02 and 2010Lj01, units are eb. 2015Ga38 give static quadrupole moment=−8 efm^2 *40*. T$_{1/2}$: deduced by evaluator from B(E2)↑=0.095 *29* (quoted as B(E2)↓=13 W.u. *+4−3* in 2015Ga38 and based on the assumption of Q=0).

γ(^{62}Fe)

E$_\gamma$	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
877.3	877.3	2$^+$	0.0	0$^+$	I$_\gamma$: 210 *40* relative to Iγ=1520 *40* and 2300 *60* for the 311γ and 415γ in ^{109}Ag target excitation, respectively. Uncertainties due to background subtraction and relative efficiency were included. B(E2)(W.u.)=14.0 *+13−11* (2015Ga38, from minimization of the two-dimensional χ^2 surface constrained by the T$_{1/2}$ measurements in 2011Ro02 and 2010Lj01, and 13 *+4−3* by projecting the χ^2 surface, assuming Q=0).

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Level Scheme

$^{62}_{26}$Fe$_{36}$