U(p,X) 2015Pr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

2015Pr03: radioactive Rb isotopes were produced using up to 10 μA of 500 MeV protons from the TRIUMF cyclotron bombarding a uranium carbide target. The atoms were surface ionized, accelerated to 28 keV, mass separated and then delivered to a gas-filled linear Paul trap. Hyperfine structures were studied by fast-beam collinear laser spectroscopy using TITAN mass trap. Measured optical spectra. Deduced spin, magnetic and electric moments, isotope shifts, changes in mean- square charge radii, and deformation parameters. Systematics study of Rb isotopes.

2015Pr03 observed two distinguishable nuclear states from measured optical spectrum but were not able to identify either the ground or isomeric state due to the insensitivity of the optical measurements to the excitation energies of the observed states. The evaluators have assumed the low-spin state with J=0 in 2015Pr03 to be the ground state and the high-spin state with J=(3) to be the isomer, based on Adopted Levels of ^{98}Rb in previous evaluation of A=98 (2003Si07).

^{98}Rb Levels

E(level)[†]	J^π	$T_{1/2}$[‡]	Comments
0	0	145 ms *25*	J^π: based on a fit with a Voigt profile to the optical spectrum of this state, which is in agreement to that expected for a single transition typical of J=0 (2015Pr03). $\delta\langle r^2\rangle(^{87}Rb,^{98}Rb)$=+2.063 fm^2 *9*(stat) *93*(syst); $\delta\langle\beta_2^2\rangle$=+0.174 for $\delta\nu(^{87}Rb,^{98}Rb)$=−910.5 MHz *53* (2015Pr03).
≈270	(3)	90 ms *10*	μ=+1.785 *1* (2015Pr03); Q=+1.431 *32* (2015Pr03) J^π: tentatively assigned by 2015Pr03. J=4 was not ruled out. μ,Q: deduced from measured hyperfine parameters relative to known values of ^{87}Rb (2015Pr03). Uncertainties are statistical only. $\langle\beta_2\rangle^2$=+0.126, extracted from the quadrupole moment (2015Pr03). $\delta\langle r^2\rangle(^{87}Rb,^{98}Rb)$=+2.084 fm^2 *9*(stat) *93*(syst); $\delta\langle\beta_2^2\rangle$=+0.177 for $\delta\nu(^{87}Rb,^{98}Rb)$=−922.5 MHz *53* (2015Pr03).

[†] From Adopted Levels.

[‡] From measured intensities of the strongest atomic transitions, which are related to the lifetime of each state and the trapping efficiency of the RFQ (2015Pr03).