⁹Be(³⁷Ca,Xγ) 2007Do11,2007Bu15

	History		
Туре	Author	Citation	Literature Cutoff Date
Full Evaluation	Ninel Nica, John Cameron and Balraj Singh	NDS 113, 1 (2012)	31-Dec-2011

Identification of the first excited state in ³⁶Ca.

2007Do11: ³⁶Ca ions were produced via two-step fragmentation technique, using the FRS-RISING setup at GSI. Primary ⁴⁰Ca beam at 420 MeV/nucleon impinged a ⁹Be target. The ³⁷Ca fragments were selected on the basis of energy loss, magnetic rigidity and time-of-flight. The ³⁷Ca ions at an energy of 196 MeV/nucleon hit a second ⁹Be target. The reaction products were selected using calorimeter telescope array (CATE) of Si-CsI(Tl) modular ΔE-E telescopes. One-neutron knockout reaction from ³⁷Ca.
2007Do11: Measured Eγ, particle-γ coin, using 15 Cluster Ge detectors with seven elements in each cluster, seven six-fold MINIBALL triple Ge detectors, and the HECTOR array of eight large-volume BaF₂ detectors. Fragment trajectories were determined using the CATE array, and a thin Si δE detector. The γ-ray spectra were Doppler-corrected using Monte Carlo simulation GEANT4, corrected for fragmentation of the primary beam using time-of-flight information.

2007Bu15: ³⁶Ca ions were produced via two-step fragmentation technique, using GANIL facility. Primary ⁴⁰Ca beam at 95 MeV/nucleon impinged a carbon target. The ³⁷Ca fragments were selected on the basis of energy loss, magnetic rigidity and time-of-flight using ALPHA spectrometer at GANIL. The ³⁷Ca ions at an energy of 45 MeV/nucleon hit a ⁹Be target. The ³⁶Ca fragments were selected using SPEG spectrometer at GANIL. One-neutron knockout reaction from ³⁷Ca. Measured γ rays using an array of 74 BaF₂ detectors. The γ -ray spectra were Doppler corrected. 2007Bu36 is from the same group.

³⁶Ca Levels

E(level)	$J^{\pi \dagger}$	Comments			
0	0^{+}				
3029 11	(2 ⁺)	 J^π: from systematics and shell model calculations. E(level): mirror energy difference ΔE_M=E(³⁶Ca)-E(³⁶S)=-262 11 for the first excited 2⁺ states in ³⁶Ca and ³⁶S. The energy of the 2⁺ excited state in ³⁶S is at 3291 keV in Adopted Levels. 2007Dol1 interpret this 			
		arge $\Delta E_{\rm M}$ value in terms of detailed shell-model calculations using ¹⁶ O core, the <i>sd</i> shell isospin symmetric interaction, and experimental single particle energies from ¹⁷ O and ¹⁷ F. One-neutron knockout cross section=5.3 mb 20 (2007Bu15, preliminary value).			

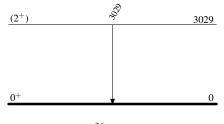
[†] Inferred by 2009AmZZ based on the structure of the mirror nucleus ³⁶Cl – same As In Adopted Levels, Gammas dataset.

γ (³⁶Ca)

Eγ	E _i (level)	\mathbf{J}_i^{π}	E _f J	f^{π}	Comments
3029 11	3029	(2+)	0 0)+	E_{γ} : weighted average of 3015 <i>16</i> (2007Do11, statistical uncertainty of 15 keV and systematic uncertainty (from energy calibration) of 5 keV, added in quadrature) and 3036 <i>11</i> (2007Bu15).

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Level Scheme



 $^{36}_{20}Ca_{16}$