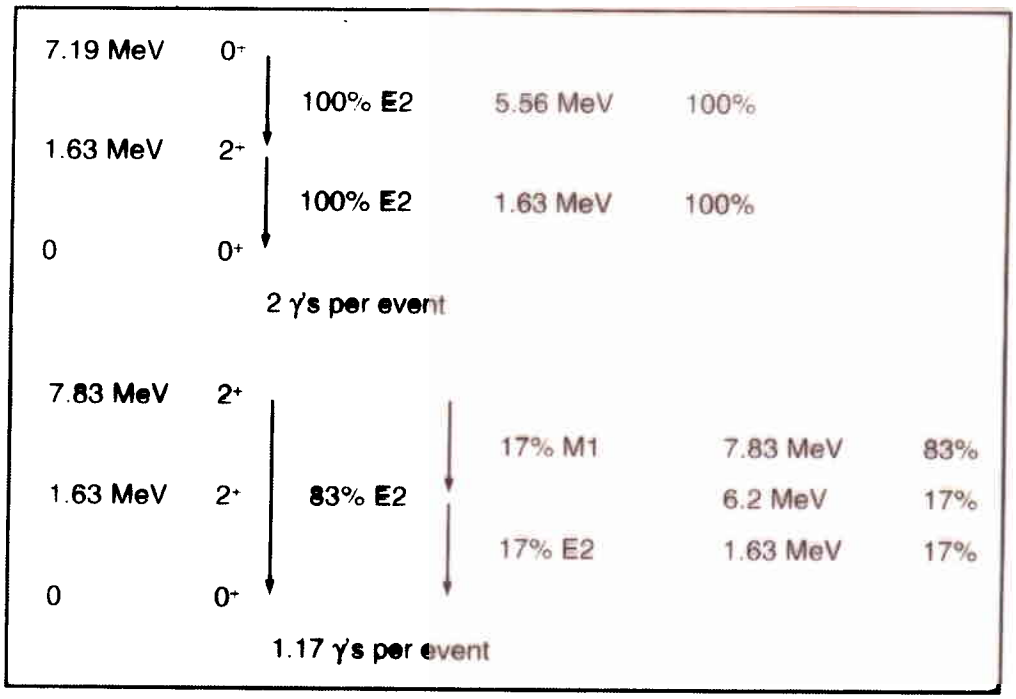

FIGURE 1. Properties of the resonances according to Peter Endt.

The probability of detecting a gamma in coincidence with a heavy ion is:

$P(2\gamma \text{ cascade}) = \varepsilon \cdot (1-\varepsilon) + \varepsilon \cdot \varepsilon + (1-\varepsilon) \cdot \varepsilon$
$P(\text{direct trans.}) = \varepsilon$

Assuming a constant gamma detection efficiency, ε:

Resonance Energy MeV	Coincidence Detection Probability	ε
E_1 =7.19	$\varepsilon_1 + (1-\varepsilon_1)\varepsilon_1 = 0.541$	0.3222
E_2 =7.83	$\varepsilon_2 + 0.17(1-\varepsilon_2)\varepsilon_2 = 0.483$	0.441

There is a problem with the ε value of the 7.19 MeV resonance, since there may be an overlap with a broad resonance just below it. I would thus recommend excluding this value.

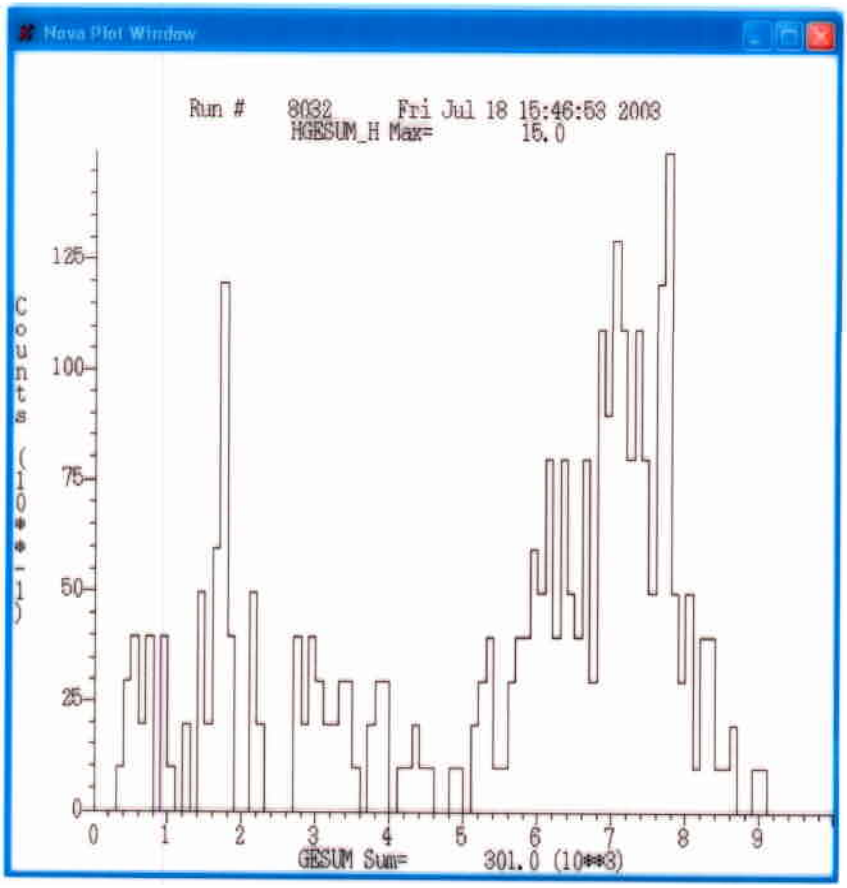

FIGURE 3. Summed gamma energy spectrum for runs 8024, 8026, 8028, 8029 and 8032, E_{beam}=972 keV/u, and a compression factor of 5.

Energy(keV/u)	Run	cianode1 range	cianodesum range
773.5	8051	[552,712]	[940,1180]
773.5	8052	[552,712]	[940,1180]
777.2	8106	[632,840]	[980,1380]
777.2	8107	[632,840]	[980,1380]
777.2	8109	[632,840]	[980,1380]
972	8024	[456,664]	[1420,1780]
972	8026	[456,664]	[1420,1780]
972	8028	[456,664]	[1420,1780]
972	8029	[296,408]	[1420,1620]
972	8032	[600,728]	[1340,1620]

Energy(keV/u)	Runs	he1esum_c	he1esum
773.5	8051	34	72
	8052		
777.2	8106	137	244
	8107		
	8109		
972	8024	264	538
	8026		
	8028		
	8029	29	59
	8032	8	25

Energy Regime (keV/u)	Runs	Total Recoil Gammas	Total Recoil Singles	Ratio of Gammas to Singles ×100%
773.5	8051	171	316	54.11%
	8052			
777.2	8106			
	8107			
	8109			
972	8024	301	623	48.31%
	8026			
	8028			
	8029			
	8032			

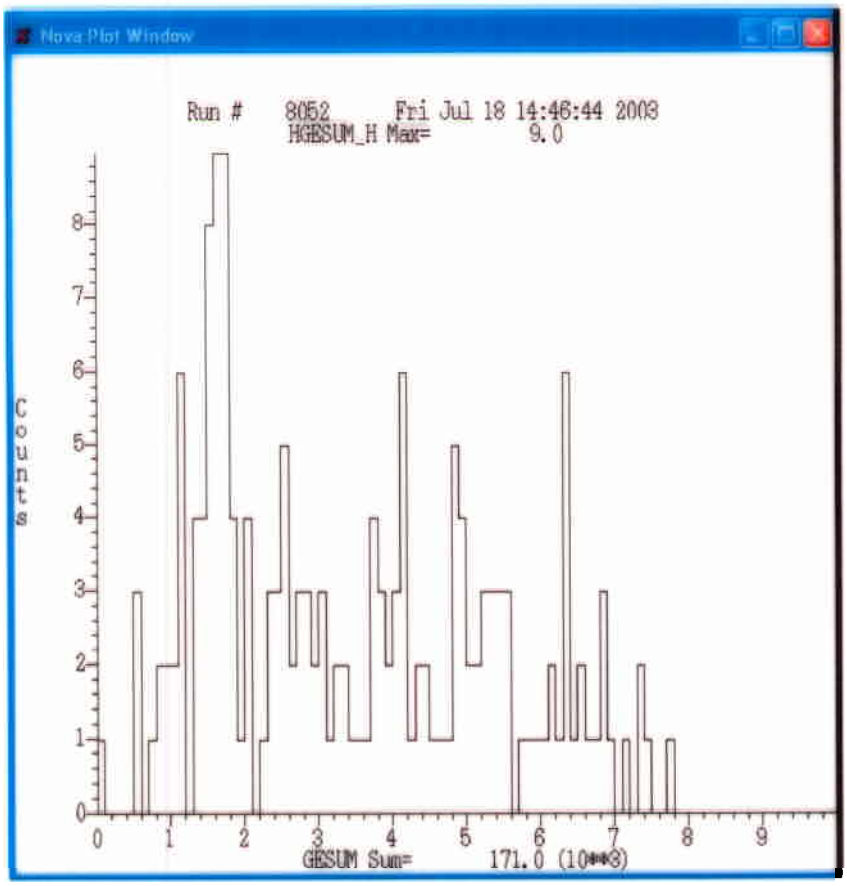

FIGURE 2. Summed gamma energy spectrum for runs 8051, 8052, 8106, 8107 and 8109, E_{beam} ≈777 keV/u, and a compression factor of 5.

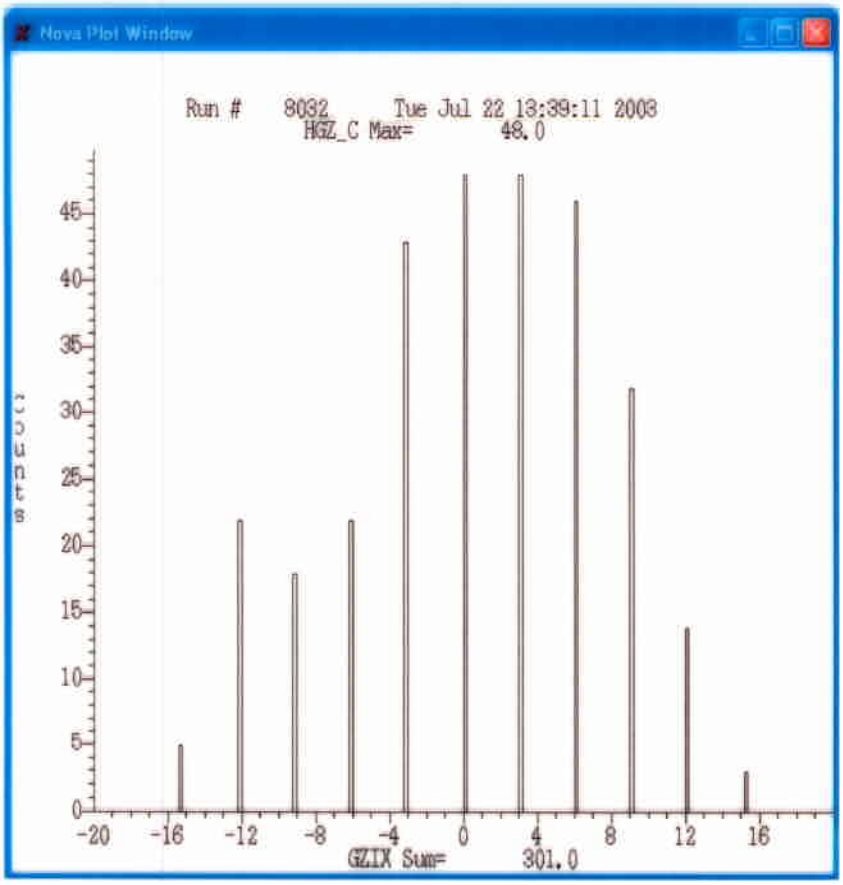

FIGURE 4. Summed z mask spectrum for runs 8024, 8026, 8028, 8029 and 8032, and E_{beam}=972 keV/u. The peak centroid, $< z >$= 1.806, and the FWHM = 16.486.