

The $^{62}\text{Ni}(\vec{p}, \alpha)^{59}\text{Co}$ Reaction at 23 MeV

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The $^{62}\text{Ni}(\vec{p}, \alpha)^{59}\text{Co}$ reaction has been investigated not only to improve the experimental information on ^{59}Co , but also to search for homologous states in ^{59}Co and ^{60}Ni . Accurate experimental data of $\sigma(\theta)$ and $A_y(\theta)$ are compared with those measured under similar conditions for $^{63}\text{Cu}(\vec{p}, \alpha)^{60}\text{Ni}$ [1]. For $^{62}\text{Ni}(\vec{p}, \alpha)^{59}\text{Co}$ three different magnetic field settings were measured at 23 MeV incident proton energy, in a high resolution experiment, using the Stern-Gerlach atomic beam source of negative polarized hydrogen ions [2]. A ^{62}Ni target, 92.78% enriched, 52 $\mu\text{g}/\text{cm}^2$ thick, evaporated on a 9 $\mu\text{g}/\text{cm}^2$ carbon backing has been used. The proton beam current was up to 0.8 μA on target with a beam polarization of 54%. The reaction products were analyzed with the Q3D magnetic spectrograph and detected in its focal plane by a multiwire proportional chamber with

readout of a cathode foil structure for position determination and ΔE -E particle identification [3]. Angular distributions and asymmetries were measured at nine different angles from 10° to 62.5° . The calibration of the α energies was carried out with a second order polynomial. Its parameters were fixed in the energy range from 0 keV to 3915 keV comparing adopted [4] γ energies with this measurement. Our quoted energies have an uncertainty of ± 3 keV. The adopted energies of the ^{59}Co levels in comparison with the results of the present work are presented in table 1.

References

- [1] P. Guazzoni *et al.*, this report, p. 9.
- [2] R. Hertenberger *et al.*, Nucl.Instr. and Meth. **A 536** (2005) 266
- [3] H.F. Wirth *et al.*, Annual report 2000, p. 71
- [4] Coral M. Baglin, NDS **95** (2002) 215

Table 1: Levels of ^{59}Co

Adopted E_{exc} keV	Present experiment E_{exc} MeV						
0.0	0.000	2816.8	2.816	3163.7		3565.0	
1099.256	1.099	2824.2	2.824	3193.8		3570.1	
1190.45	1.191	2826.2			3.200	3580.1	
1291.605	1.292	2829.1		3219.5		3599.5	3.603
1434.256	1.434	2912.0	2.911	3223.8		3622.8	
1459.51	1.459	2914.6		3236.4	3.232	3626	
1481.72	1.481		2.923	3240.97			3.640
1744.67	1.745		2.949	3276.0	3.276	3652.8	
2061.76	2.062	2957.9			3.309	3667.2	3.663
2087.2	2.088	2963.1			3.312		3.672
2153.62	2.155	2965.9	2.965	3319.99		3737.3	
2183.5	2.183	2973.0		3323.4		3757.5	3.758
2204.78	2.205	2977.0		3325.4		3768.9	
	2.318	3014.9		3350.9	3.350		3.778
2394.8	2.395	3016.8		3366.0		3792.4	
2478.7	2.479	3062.7	3.063	3382.0		3807.7	3.808
	2.520	3081.62		3414.5	3.411	3820.9	
2540.4	2.540	3090.4		3426.1		3832.1	
2581.71		3120.9			3.471		3.837
2585.8	2.585	3122.06			3.484	3842.7	
2713.1	2.713		3.136	3491.6		3854.9	3.858
2722.4		3140.5		3497.4	3.497	3888.6	3.886
2770.2		3141.03			3.538		3.900
2781.7	2.782	3160.4			3.544	3915.2	3.915