

# Status of the LANL <sup>15</sup>N System Analysis

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## Summary of <sup>15</sup>N Analysis

		channel	a <sub>c</sub> (fm)	I <sub>max</sub>		
		n+ <sup>14</sup> N	2.5	2		
		p+14C	4.3	3		
		α+11B	5.1	3		
Reaction	Energ	ies (MeV)	# data points	Types of c	lata	χ²
<sup>14</sup> N(n,n) <sup>14</sup> N	$E_n = 0 - 2.5$		931	$\sigma_{\mathrm{T}}, \sigma(\theta)$		889
<sup>14</sup> N(n,p) <sup>14</sup> C	$E_n = 0 - 3.0$		362	$\sigma_{int}$		766
<sup>14</sup> N(n,α) <sup>11</sup> B	E <sub>n</sub> =1.33 - 2.32		104	$\sigma_{\text{int}}$		304
<sup>14</sup> C(p,n) <sup>14</sup> N	$E_p = 1.17 - 3.1$		407	$\sigma_{int,} \sigma(\theta), A_y(\theta)$		1163
<sup>11</sup> Β(α,n) <sup>14</sup> Ν	E <sub>α</sub> =0.33 - 2.39		190	$\sigma_{\text{int}}$		626
<sup>11</sup> Β(α,p) <sup>14</sup> C	E <sub>α</sub> =1.4	5 - 2.94	145	$\sigma_{\text{int,}}\sigma(\theta$	)	564
		Total	2139			4312



#### <sup>14</sup>N(n,n)<sup>14</sup>N Differential Cross Section

180





En= 1.1300 MeV

14n(n,n)14n dα/dΩ E= 1.130 MeV

calculated at E= 1.130 14N(n,n)14N diff. cross

400 10<sup>-3</sup>

350

Cl 250

ਰੋ<sub>200</sub>

100

50 L

30 60 90

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14n(n,n)14n do/dΩ E= 1.756 MeV

θ\_









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<sup>5</sup> 











120 150

180

90

90 120 150

θ....

14c(p,n)14n Ay(p) E= 2.272 MeV

calculated at E= 2.272

polarization times xsec, niecke7

11b(4he,p)14c dα/dΩ E= 2.333 MeV

calculated at E= 2.333 diff. cross section en = 2.333 mer

2.0 \*10<sup>-3</sup>

1.5

10

0.0

-0.5

-1.0

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do/dΩ

(d) ▲ 0.5 .



















11b(4he,p)14c dσ/dΩ E= 1.572 MeV





do/dΩ



### <sup>11</sup>B(α,p)<sup>14</sup>C Differential Cross Section





11b(4he,p)14c dσ/dΩ E= 2.333 MeV

diff. cross section en = 2.333 mey

60

90

 $\boldsymbol{\theta}_{\text{CM}}$ 

120

150

180

calculated at E= 2.333

10<sup>-4</sup>

dơ/dΩ 10<sup>-5</sup>

0

30



















# <sup>14</sup>N(n,p)<sup>14</sup>C Integrated Cross Section





#### <sup>14</sup>N(n,α)<sup>11</sup>B Integrated Cross Section





### <sup>11</sup>B(α,n)<sup>14</sup>C Integrated Cross Section





### <sup>11</sup>B(α,p)<sup>14</sup>C Integrated Cross Section



### **Summary/Conclusions**

- The current EDA analysis of the n+<sup>14</sup>N (<sup>15</sup>N system) reactions does a rather good job of describing most of the low-energy data. A notable exception is the low-energy <sup>11</sup>B(α,p)<sup>12</sup>C cross section measured by Wang.
- Different J<sup>π</sup> values were found for some of the levels. In addition to the narrow resonances, underlying broad structure is important for most of the reactions.
- An extension to higher energies is needed. Do we have enough experimental data?
- Charged particle evaluations for  $p+^{12}C$  and  $\alpha+^{11}B$  could be produced from a higher-energy extension of this analysis, in addition to the one for  $n+^{14}N$ .

