Poster #4

R-matrix analysis of reactions in the ^{9}B compound system

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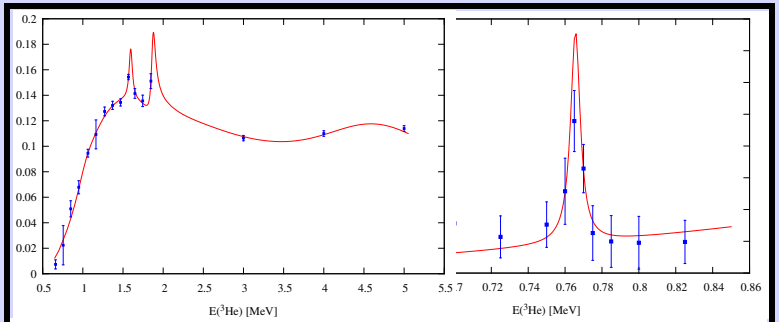
The ^{7}Li Problem in BBN

- At η_{wmap} ^{7}Li/H$|_{BBN}$~(2.2−4.2)^{7}Li/H$|_{halo*}$
- 4.5−5.5σ → the "Li problem"
- Resonant destruction — Cyburt & Pospelov 2009; Chakraborty, Fields & Olive 2011
- TUNL NDG

E_x(MeV ± keV)	$J^\pi;T$	Γ_{cm}(keV)
16.024 ± 25	$T=(\frac{1}{2})$	180 ± 16
16.710 ± 100	$(\frac{5}{2}^+);(\frac{1}{2})$	
17.076 ± 4	$\frac{1}{2}^-;\frac{3}{2}$	22 ± 5
17.190 ± 25		120 ± 40
17.540 ± 100	$(\frac{7}{2}^+);(\frac{1}{2})$	
17.637 ± 10		71 ± 8

The R-matrix (LANL-EDA code)

- R matrix: ***unitary***, multichannel
- Interior/exterior regions; channel surf.
- R-matrix elements: $G_B = [H + \mathcal{L}_B - E]^{-1}$
- Channels: ^{3}He+^{6}Li;p+^{8}Be*;d+^{7}Be;γ+^{9}B



E_x(MeV)	J^π	Γ(keV)	$E(^3\mathrm{He})$	Strength
16.4754	$1/2^-$	768.46	−0.2054	weak
17.1132	$1/2^-$	0.14	0.7664	strong
17.2012	$5/2^-$	871.63	0.8984	weak
17.2809	$3/2^-$	147.78	1.0178	strong
17.6754	$5/2^+$	33.33	1.5947	strong
17.8462	$7/2^+$	2036.21	1.8509	weak
17.8577	$3/2^-$	42.52	1.8681	strong
18.0582	$3/2^+$	767.11	2.1689	weak
18.4229	$1/2^+$	5446.32	2.7309	weak
18.6872	$1/2^-$	10278.41	3.1124	weak
19.6192	$3/2^-$	1478.22	4.5104	weak

Conclusion

- 9B resonance unlikely explanation for ^{7}Li prob.
- Unitary Reaction Network for BBN req'd.
- URN ***permits*** correct sensitivity studies