^{26}Al(n,p/α)

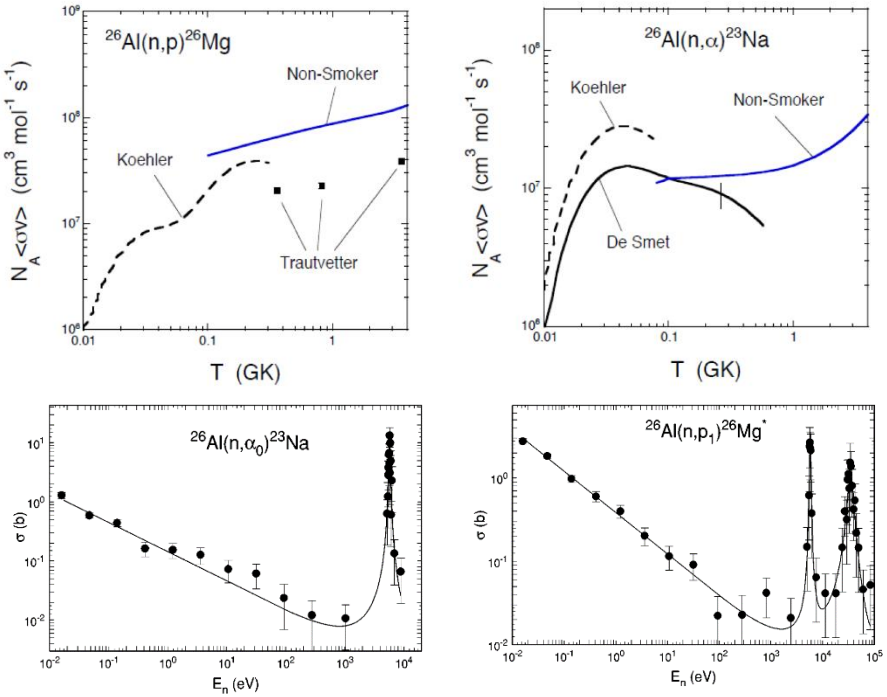
Why ^{26}Al(n,p/α)?

Strong motivations for their implications in Nuclear Astrophysics (Neon and Carbon shell burning).

Data needed at least up to 300 keV.

Previous (scarce) data show serious discrepancies.

- (n,p*) Koehler, 70 keV
- (n,p) Trautvetter
- (n,a*) Koehler, 10 keV
- (n,a) De Smet (100 kev)



n_TOF Collaboration presented a letter of intent (2012, C. Lederer) and a proposal (2014, C. Lederer) for the measurement of both reaction channels.

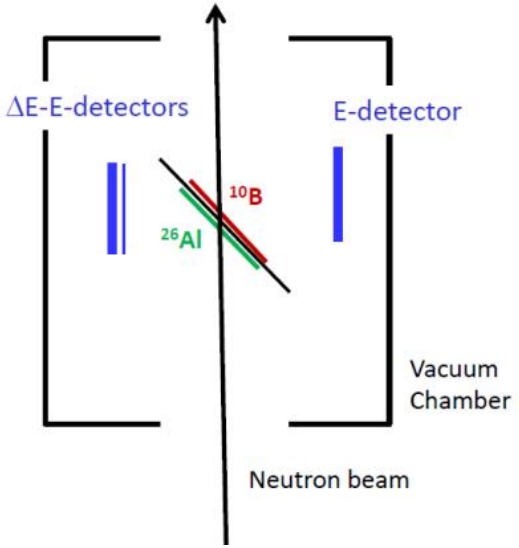
- Test performed in EAR2 in 2015
- Measurement performed in EAR2 in 2016

TABLE I. Q values and corresponding ejectile energies for the possible ^{26}Al(n, α_i)^{23}Na and ^{26}Al(n, p_i)^{26}Mg reactions.

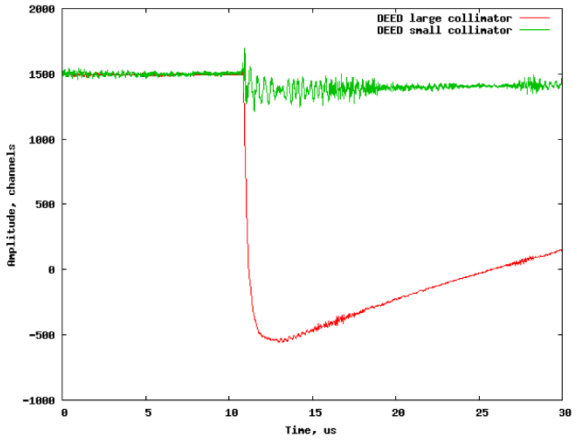
	Q value (MeV)	E (MeV)
p_0	4.78	4.60
p_1	2.98	2.87
p_2	1.85	1.78
α_0	2.97	2.53
α_1	2.53	2.16
α_2	0.89	0.76

Why ^{26}Al(n,p/α)?

Setup used



Test vs Experiment



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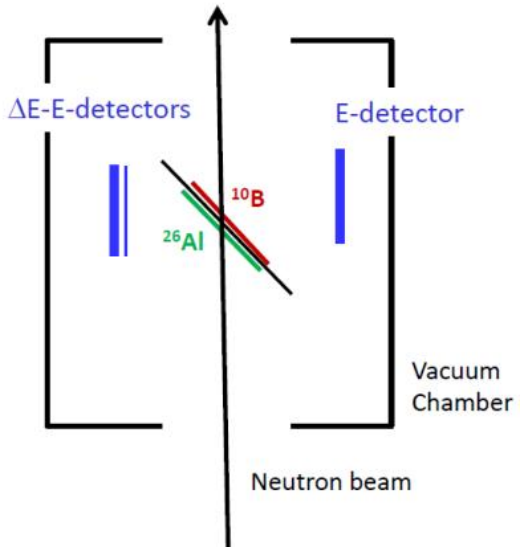

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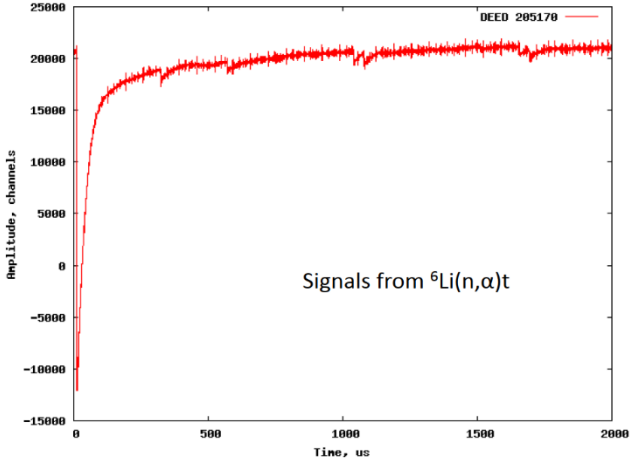

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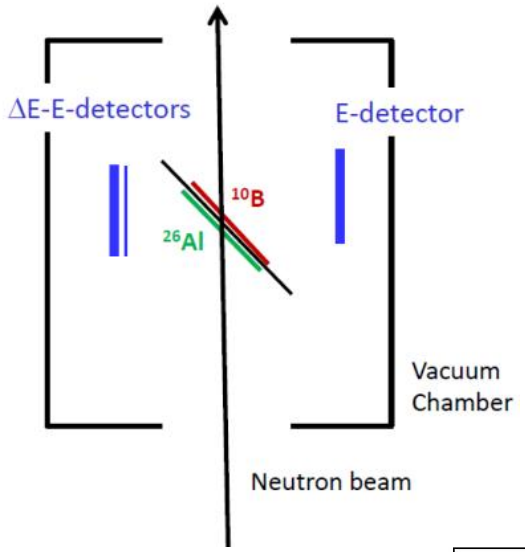
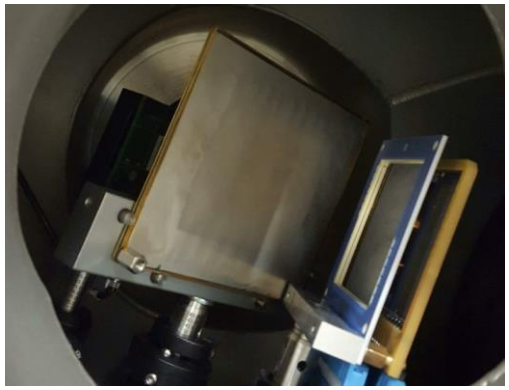
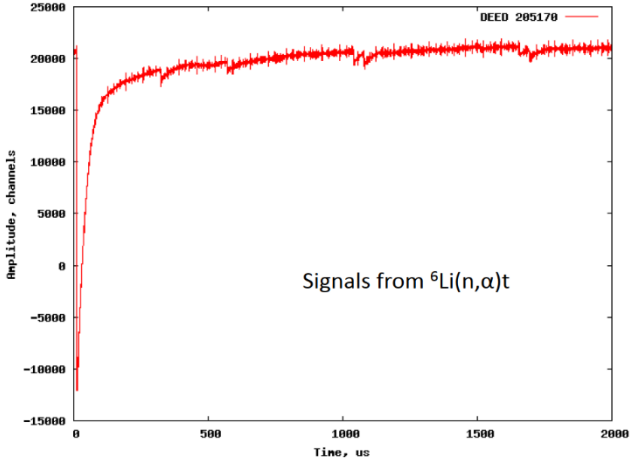


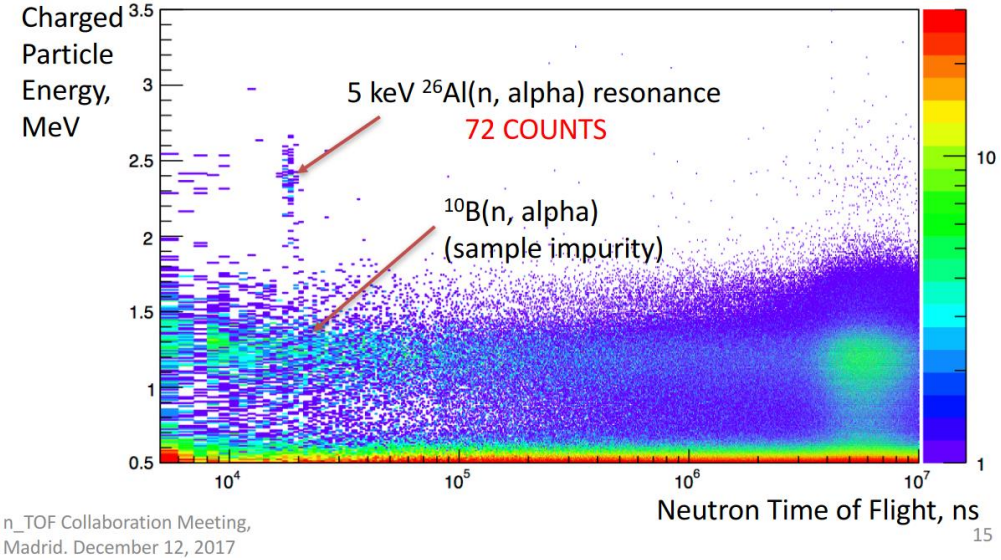


Test vs Experiment



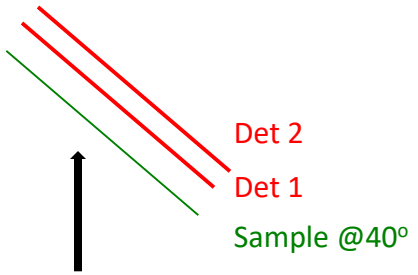
Latest Results:

10% of 10 week beam-time | ^{26}Al: α ~ 2.2 MeV | ^{10}B: α ~ 1 MeV



Proposed setups for a test in EAR2 (2021, 0.5e18 p.o.t.)

- Silicon telescope 20 μm + 20 μm in the beam
- Silicon telescope 20 μm + 300* μm in the beam "(^{7}Be(n,p)+^{7}Be(n,α) setup)"
- Small collimator (but flux 2-3 times higher than n_TOF-Ph3)
- LiF sample (for the test)



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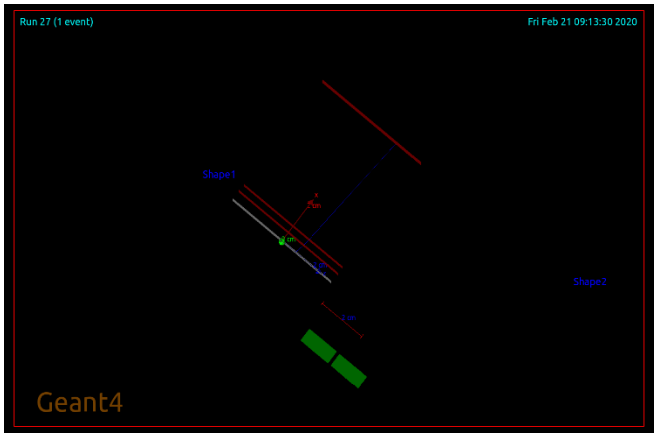
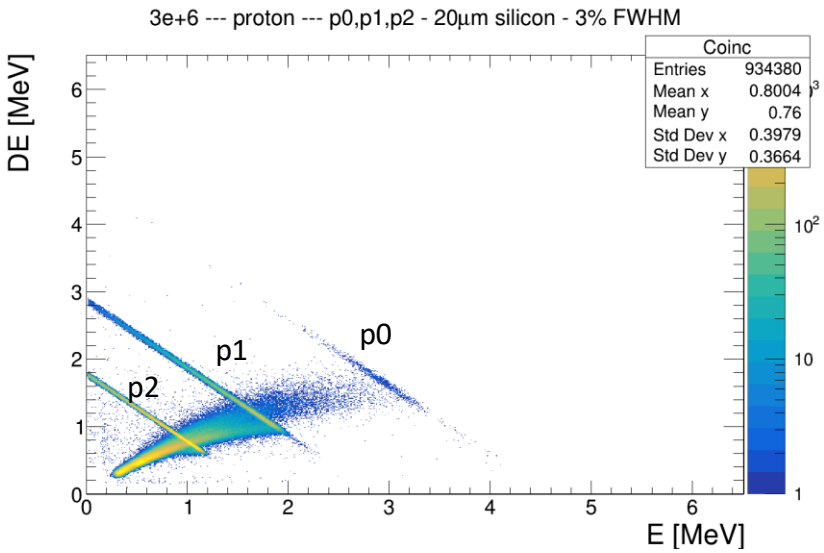
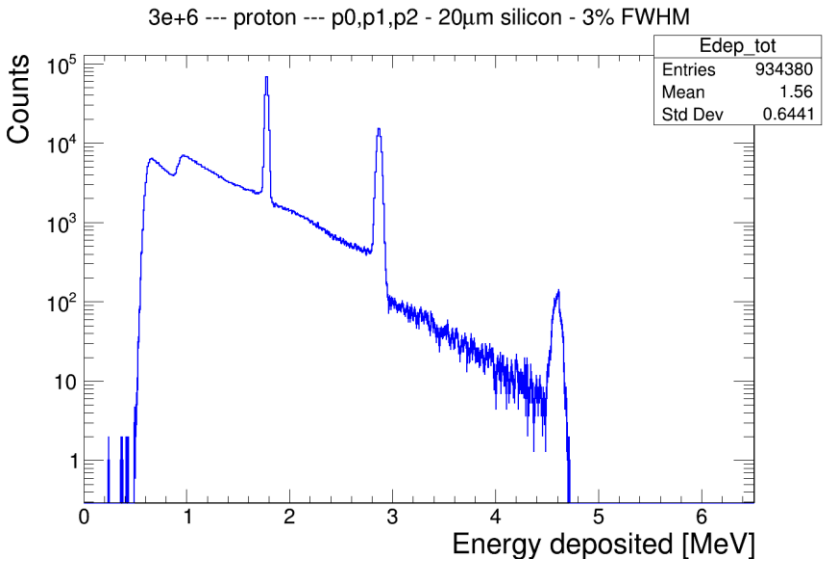
- LiF sample (for the test)
- >5 times higher efficiency than Edinburgh setup



^{26}Al(n,p)





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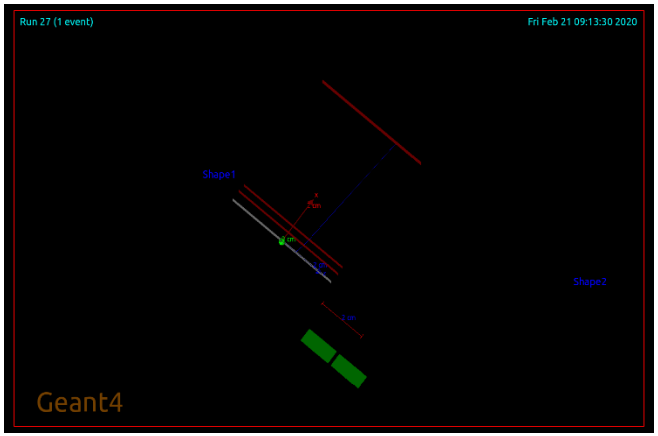
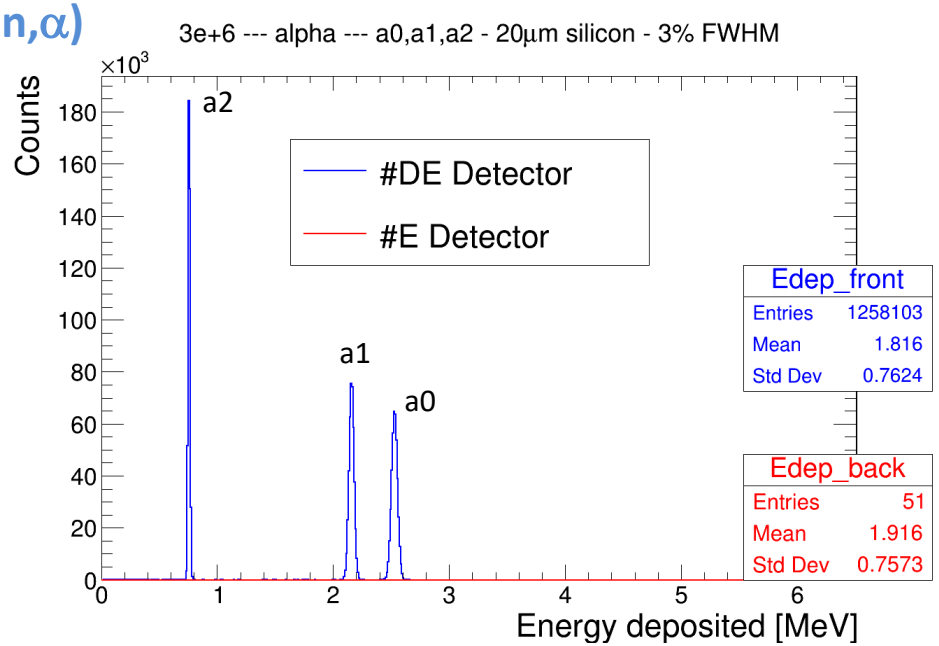
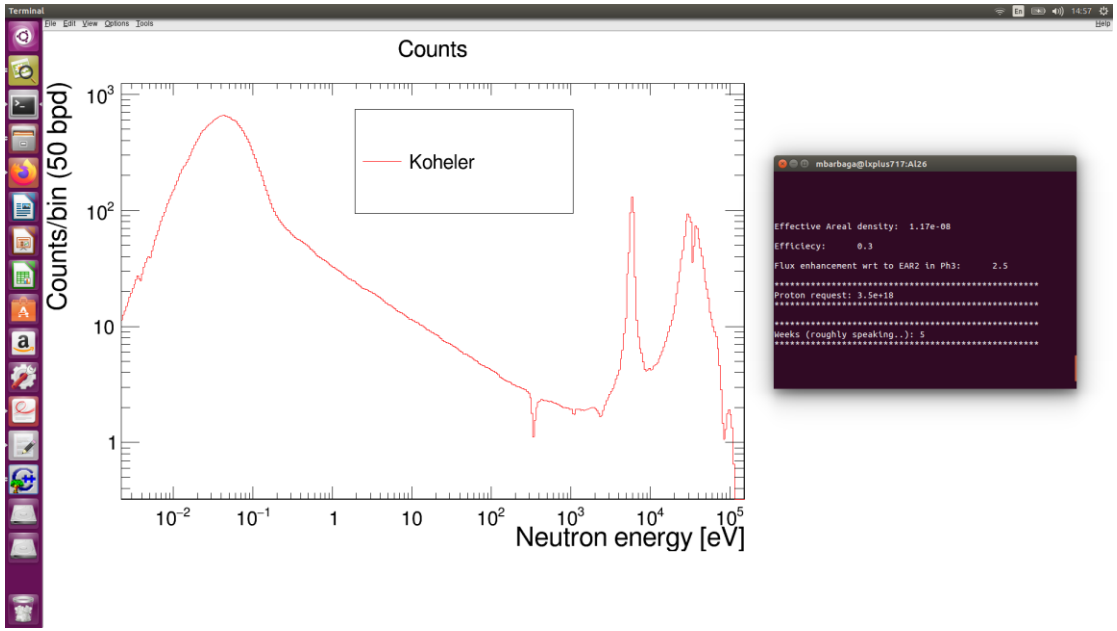


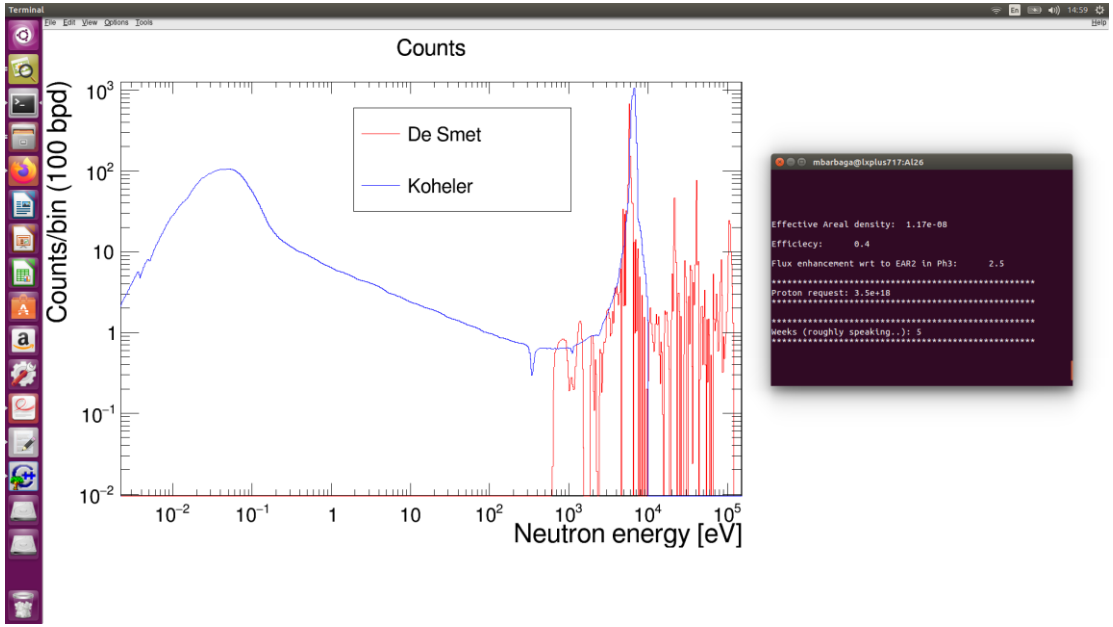
^{26}Al(n,α)



Count rate estimation



^{26}Al(n,p)



^{26}Al(n,α)

Thanks for your attention