Positron rates estimate for Marathon

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Jefferson Lab – March 01, 2018

Model used

- Charge-symmetric code from Peter Bosted

- Considering contribution from π0 production:

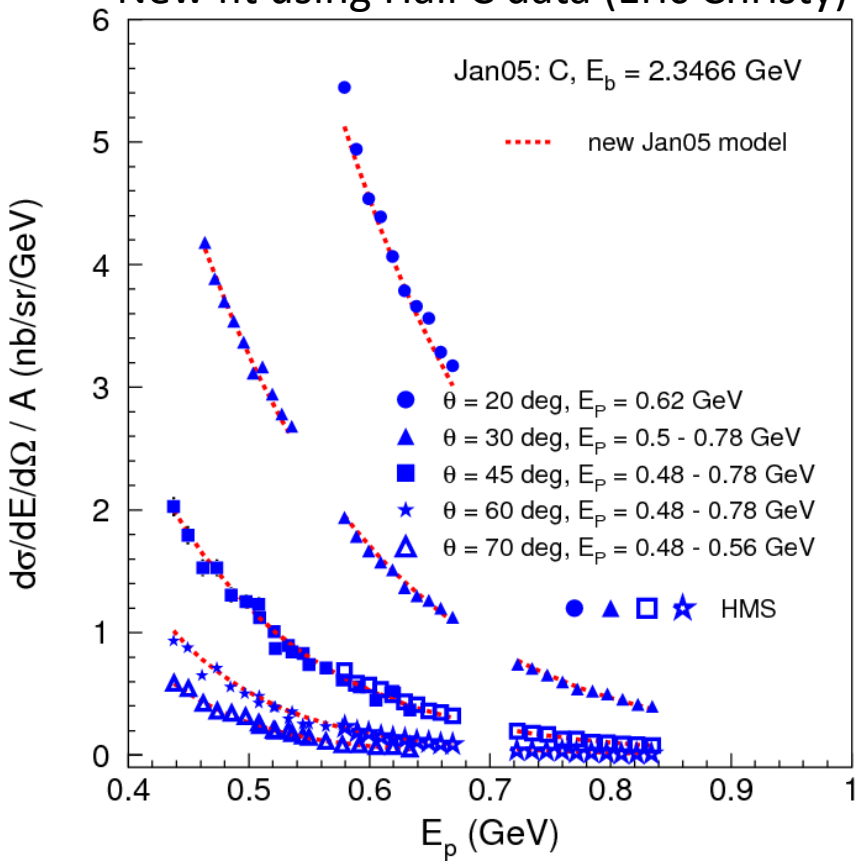
1) π0 produced
2) π0 decay in the target (two photons)
3) Photon has to interact with nucleus to produce e-/e+ pair

- Need to define materials on beam path to produce π0

- Need to define materials on photon path to convert into e-/e+ pair

Extensively and successfully used during 6GeV era

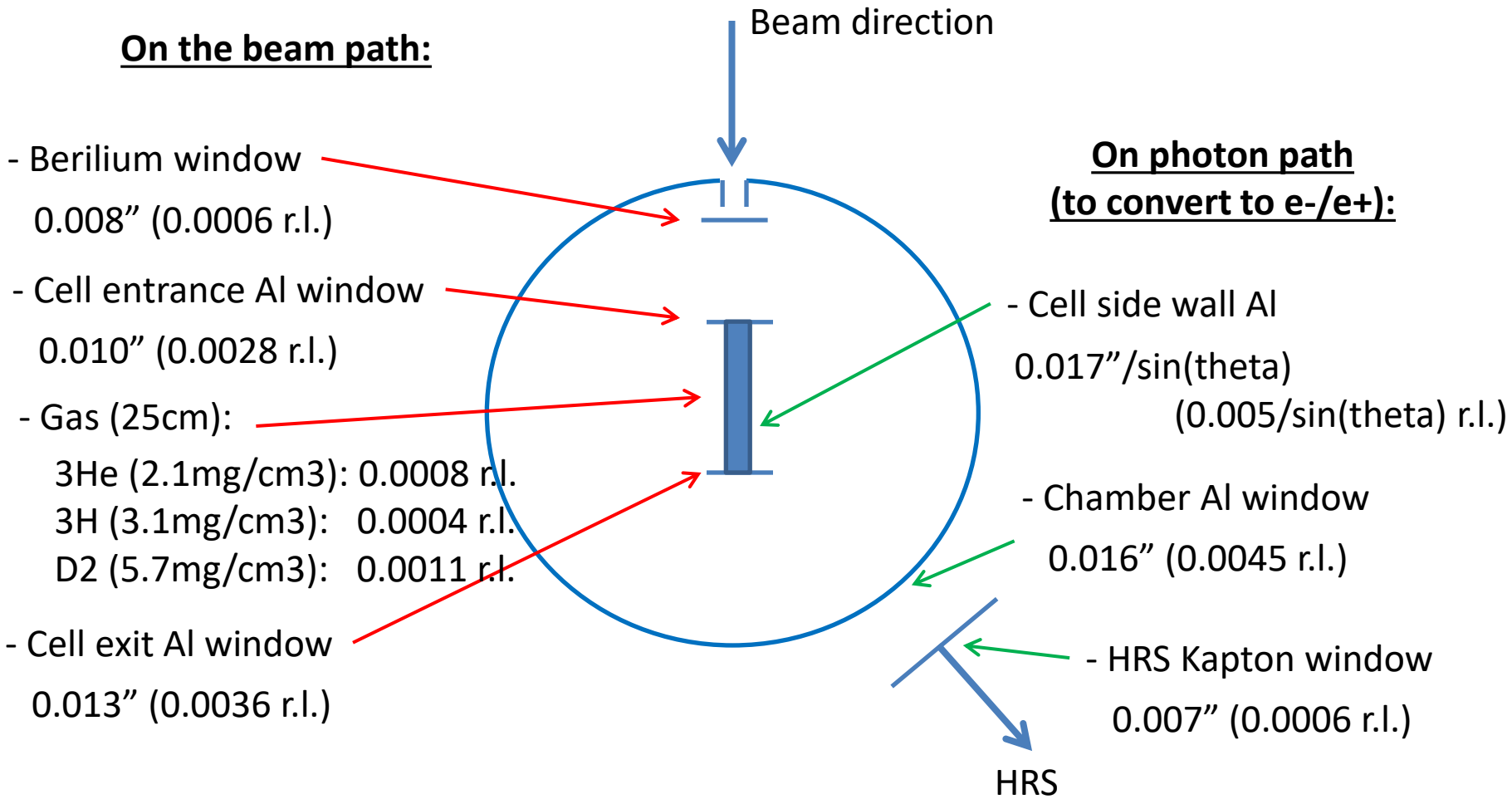
New fit using Hall C data (Eric Christy)



Marathon: considering same weight for a proton or a neutron in target

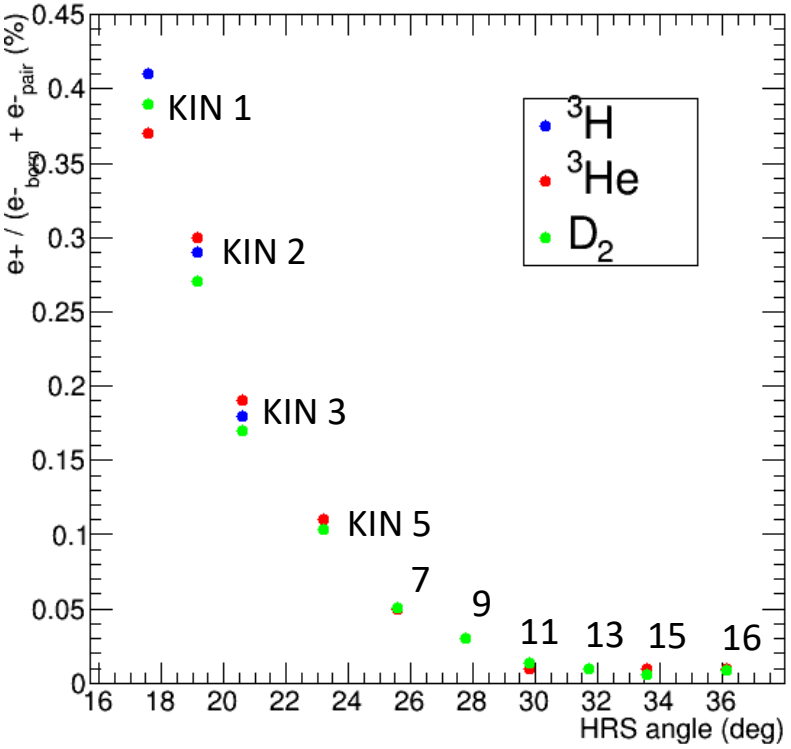
Thanks to Debaditya Biswas, Simona Malace, and Eric Christy for the code and discussions!

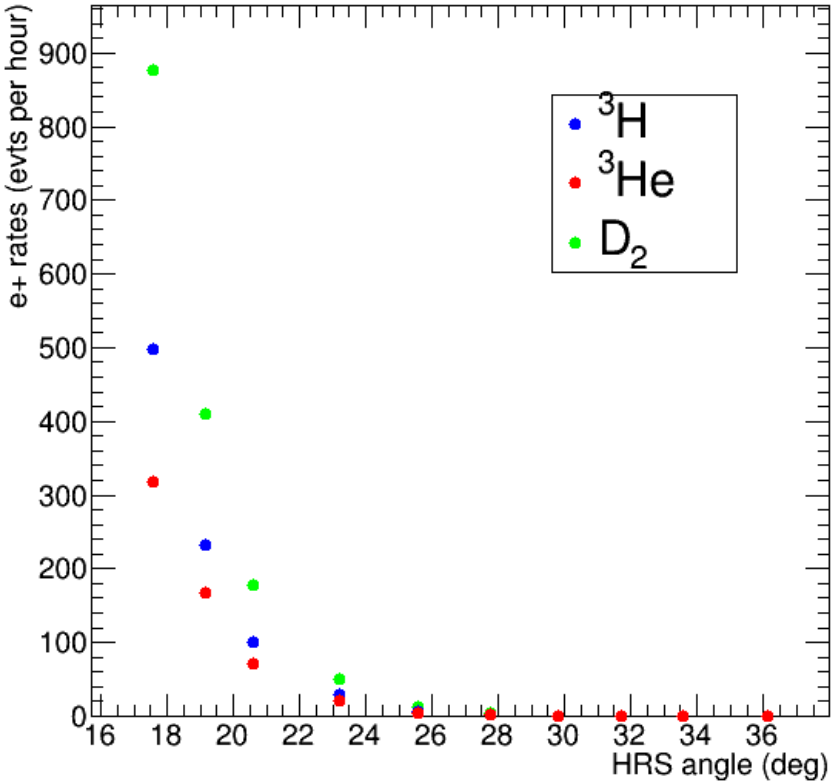
Diagram of considered materials



e^+/e^- ratios and e^+ rates estimate

E_beam = 10.6 GeV
p_HRS = 3.1 GeV/c
(except for kin16, where p=2.9GeV/c)





Considering:

Solid angle = 6 msr

Inefficiencies: Same as used for Marathon e- rates estimate: 25% (not sure how the "20% RC effect" was used - I am not considering this here)

(Can we do Physics with π+/π- ratio from 3He, 3H, and D2?!!)