

International Scoping Study

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R. Fernow, J. Gallardo

fernnow@bnl.gov, gallardo@bnl.gov

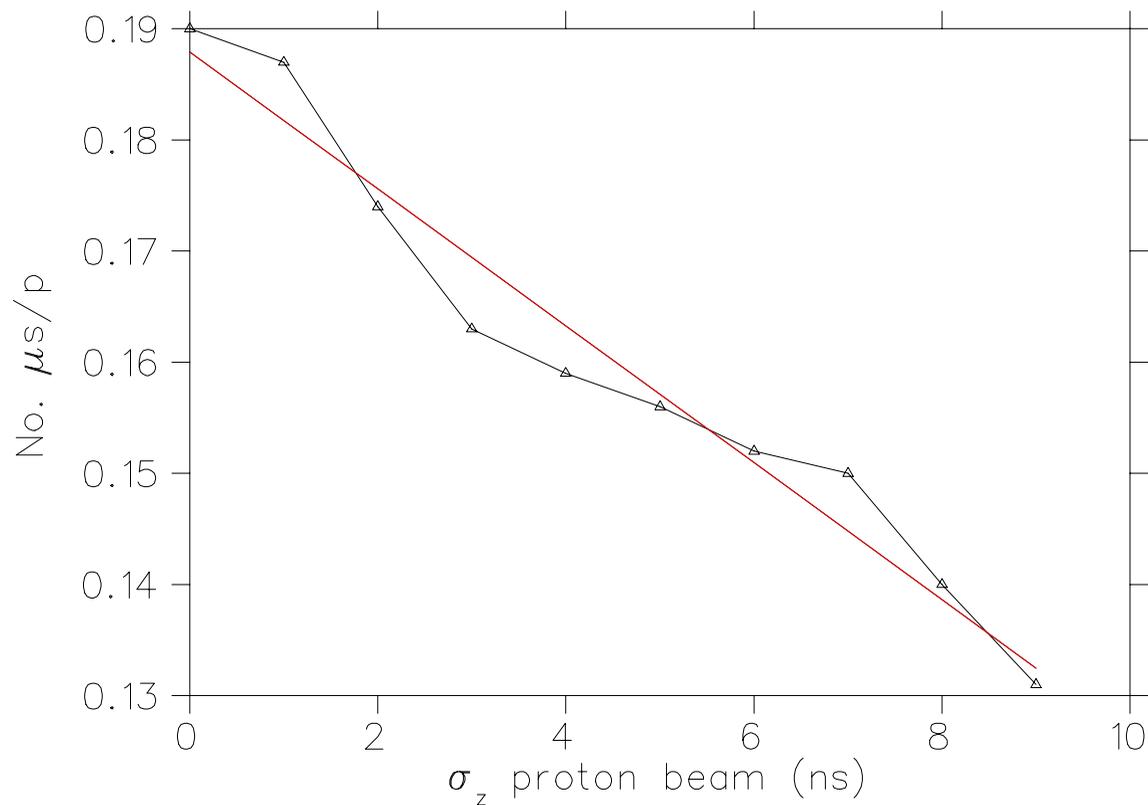
Brookhaven National Laboratory

Performance as a function of proton σ_z

Figure of merit: Number of muons within the acceptances, transverse $A_T = 30$ mm rad and longitudinal $A_L = 150$ mm per incident proton on target.

We have examined the dependence, with the proton bunch length, of the figure of merit for the U.S. design.

Performance as a function of proton σ_z



Performance as a function of proton σ_z

As the proton length increases more muons fail to meet the conditions of optimal tuning of the channel. This is *surprising*; in a previous study (MUCOOL-note 031) we concluded that *...the most important constrain to the proton bunch length is the intrinsic width of the muon beam due to the kinematics of the pion decay. A proton bunch length as large as ≈ 2 ns will not significantly increase the muon phase space volume*

$$\Delta_{tg} \approx 0.15 \text{ ns}$$

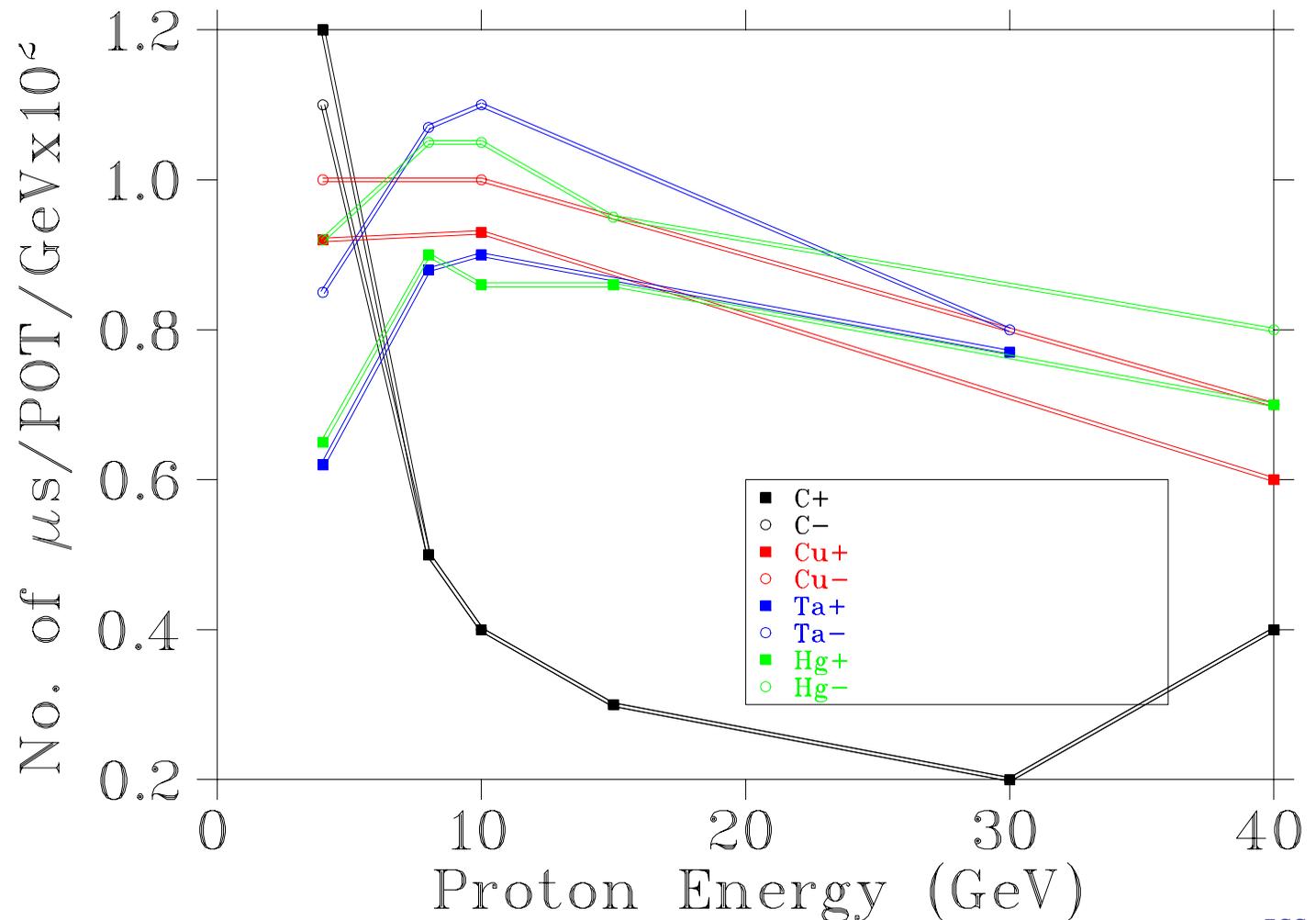
$$\Delta_{\pi decay} \approx 2.6 \text{ ns}$$

Performance as a function of proton σ_z

σ_z %	μ_A/π	μ_A/p
1 fs	0.132	0.19
1 ns	0.129	0.187
2 ns	0.122	0.174
3 ns	0.117	0.167
4 ns	0.113	0.159
5 ns	0.109	0.152
7 ns	0.102	0.146
9 ns	0.093	0.133

U.S. Study2A: Beam-Target Survey

MARS15 production files



U.S. Study2A: Beam-Target Survey

Energy (GeV)	Target	L (cm)	$\mu_A/p/\text{GeV}$	
			μ^+	μ^-
4	C	66	0.012	0.011
40	C	66	0.004	0.004
4	Cu	27	0.009	0.010
10	Cu	27	0.009	0.010
40	Cu	27	0.006	0.007