

DarkLight 50 MeV Physics Program

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50 MeV Physics

Open ended discussion on what the future physics plan looks like.

The primary goal is to perform a 17 MeV search for a new force carrier.

50 MeV Physics

Assuming we have successfully run a 30 MeV program, and assuming there is a 50 MeV ring (cryomodule?) design that is within budget, will be built, etc.

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- All of the non-A' physics that can be done at 30 MeV can be extended to 50 MeV
 - Keep in mind both spectrometers will nominally be at 20°

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 - New targets?
 - Same beam dump and therefore reduced beam current?
 - Movable spectrometers? (!?) (The current 20° spec probably can't move)

Radius measurements?

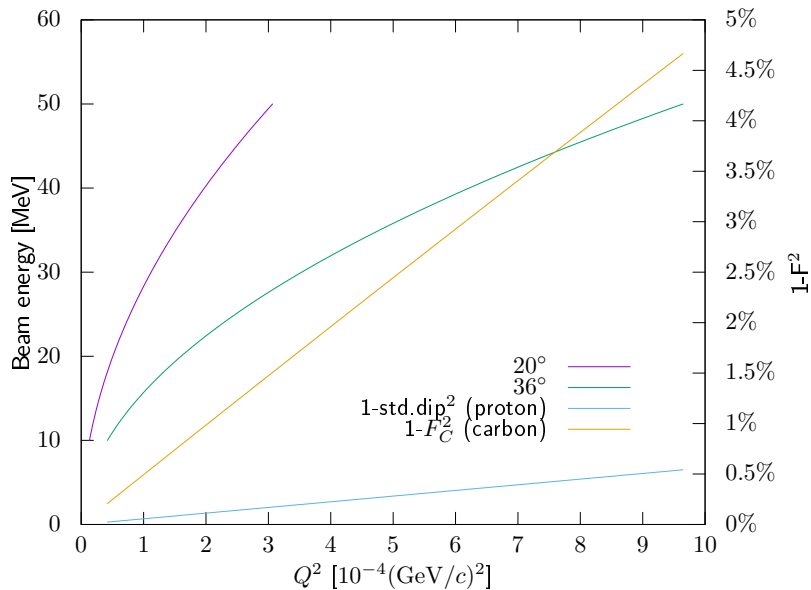
At each energy, we measure two angles. Could do double ratio:

$$\frac{d\sigma(36^\circ, 50\text{MeV})/d\sigma(36^\circ, 10\text{MeV})}{d\sigma(20^\circ, 50\text{MeV})/d\sigma(20^\circ, 10\text{MeV})}$$

- Inner ratio kills acceptance, efficiency
- Outer ratio kills normalization, gives us relative slope
- Could do for
 - Carbon
 - H, via CH + C measurement
 - Others? Maybe He with jet target?
- N.B.: If we could measure backward angles: G_M !

We would need to use both target chambers!

Reach/sensitivity



50 MeV Physics

Very open-ended discussion here, hard to know what is realistic at this point.

- Moveable spectrometers seem to be the key point of discussion
- Turning the key to a broader physics program
 - What is the future of DarkLight?

