SeaQuest Goals and Status

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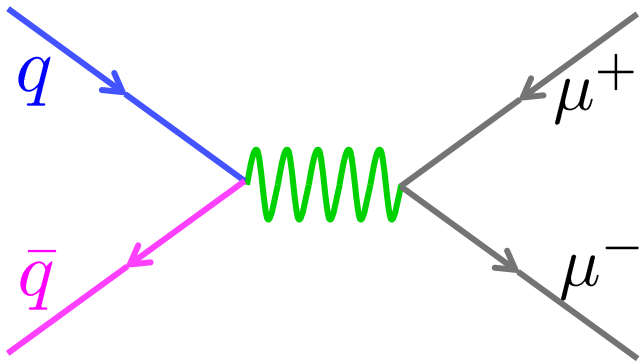
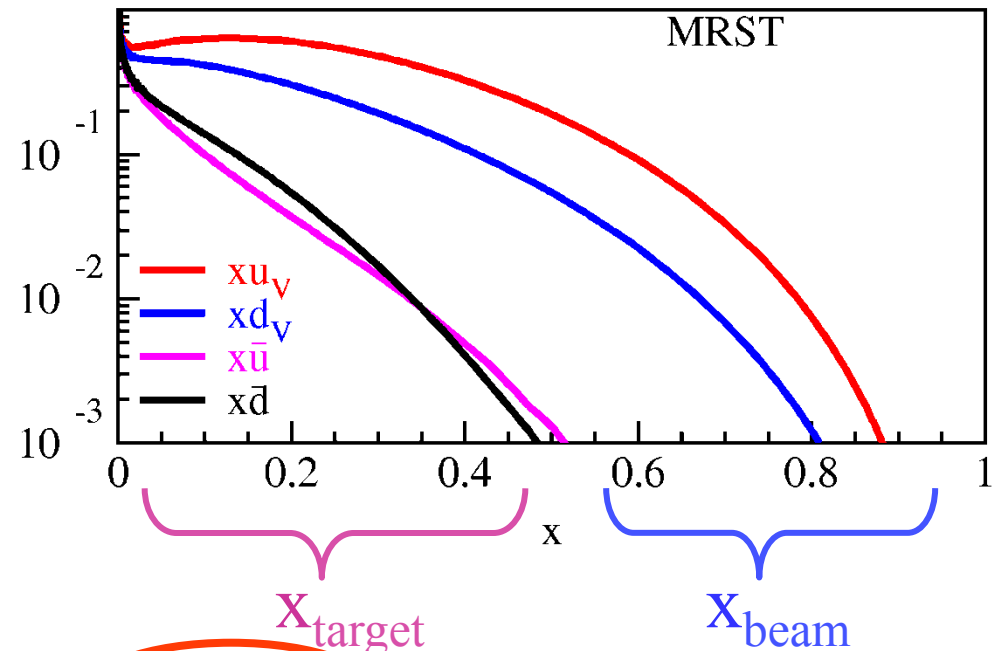
27 February 2012

Fermilab All Experimenters' Meeting

Drell-Yan scattering:
A laboratory for sea qua



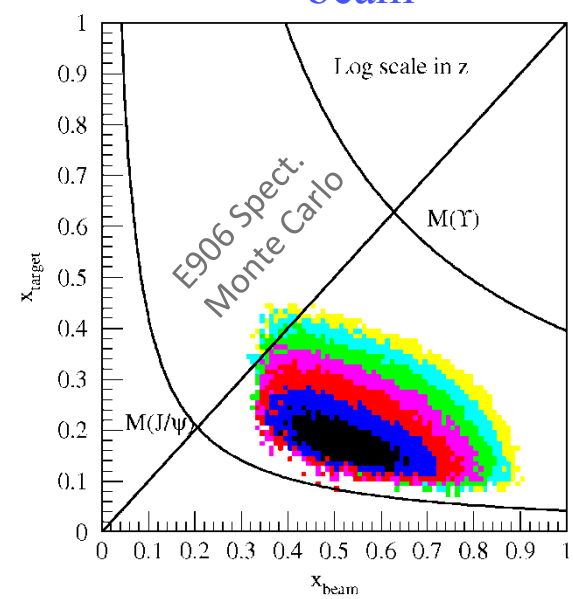


$$\frac{d^2\sigma}{dx_b dx_t} = \frac{4\pi\alpha^2}{x_b x_t s} \sum_{q\in\{u,d,s,\dots\}} e_q^2 \left[\bar{q}_t(x_t) q_b(x_b) + \bar{q}_b(x_b) q_t(x_t)\right]$$

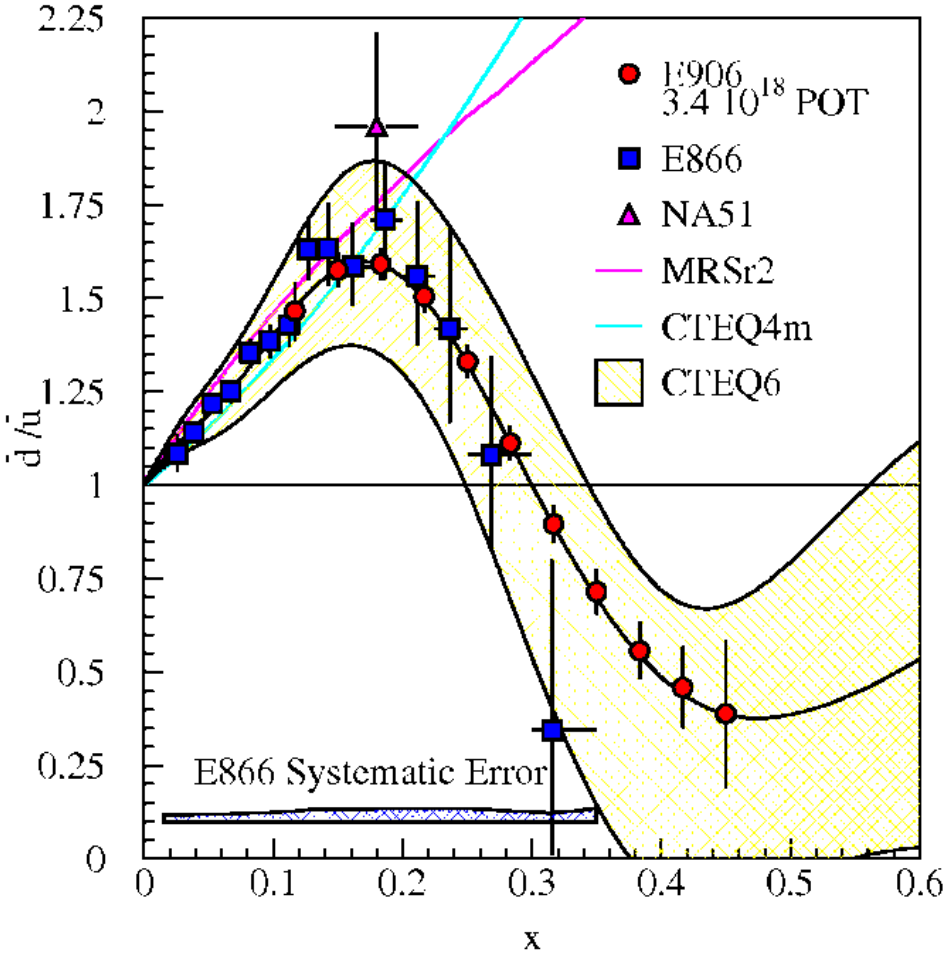
Detector acceptance chooses x_{target} and x_{beam}.

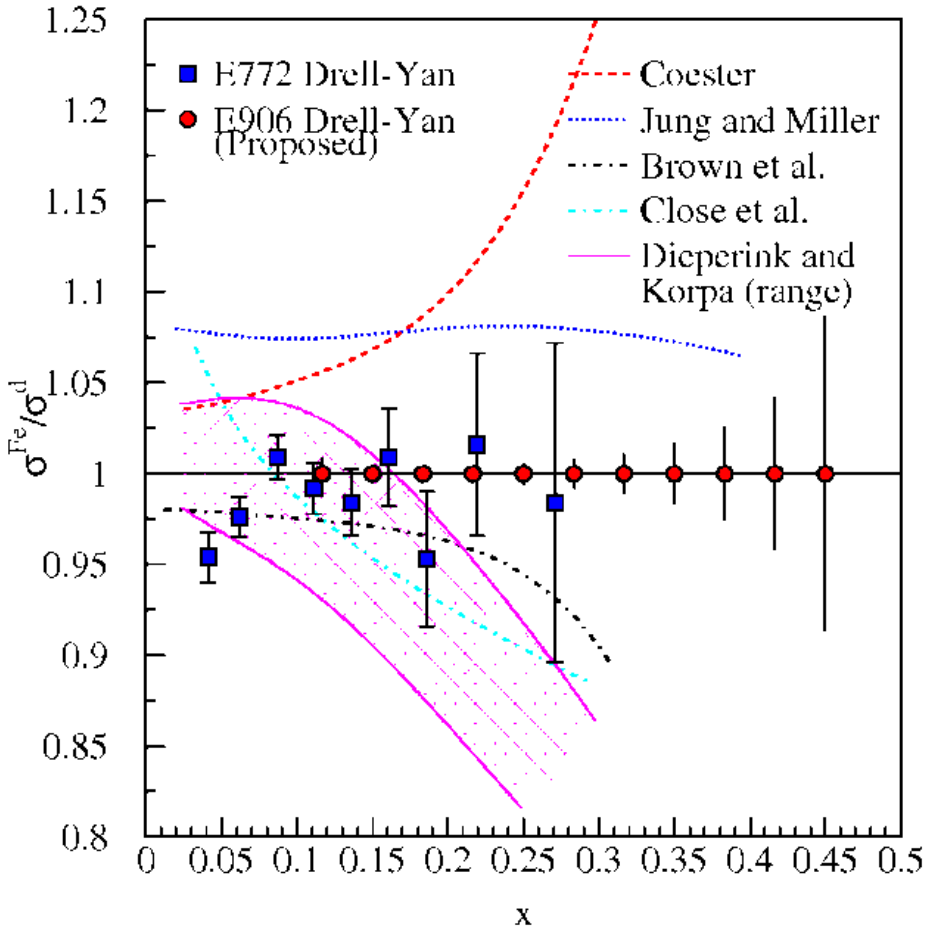
- **Fixed target**) high $x_F = x_{beam} - x_{target}$
- Valence Beam quarks at high-x.
- Sea-target quarks at low/intermediate-x.

$$\left.\frac{\sigma^{pd}}{2\sigma^{pp}}\right|_{x_b \gg x_t} \approx \frac{1}{2}\left[1 + \frac{\bar{d}(x_t)}{\bar{u}(x_t)}\right]$$

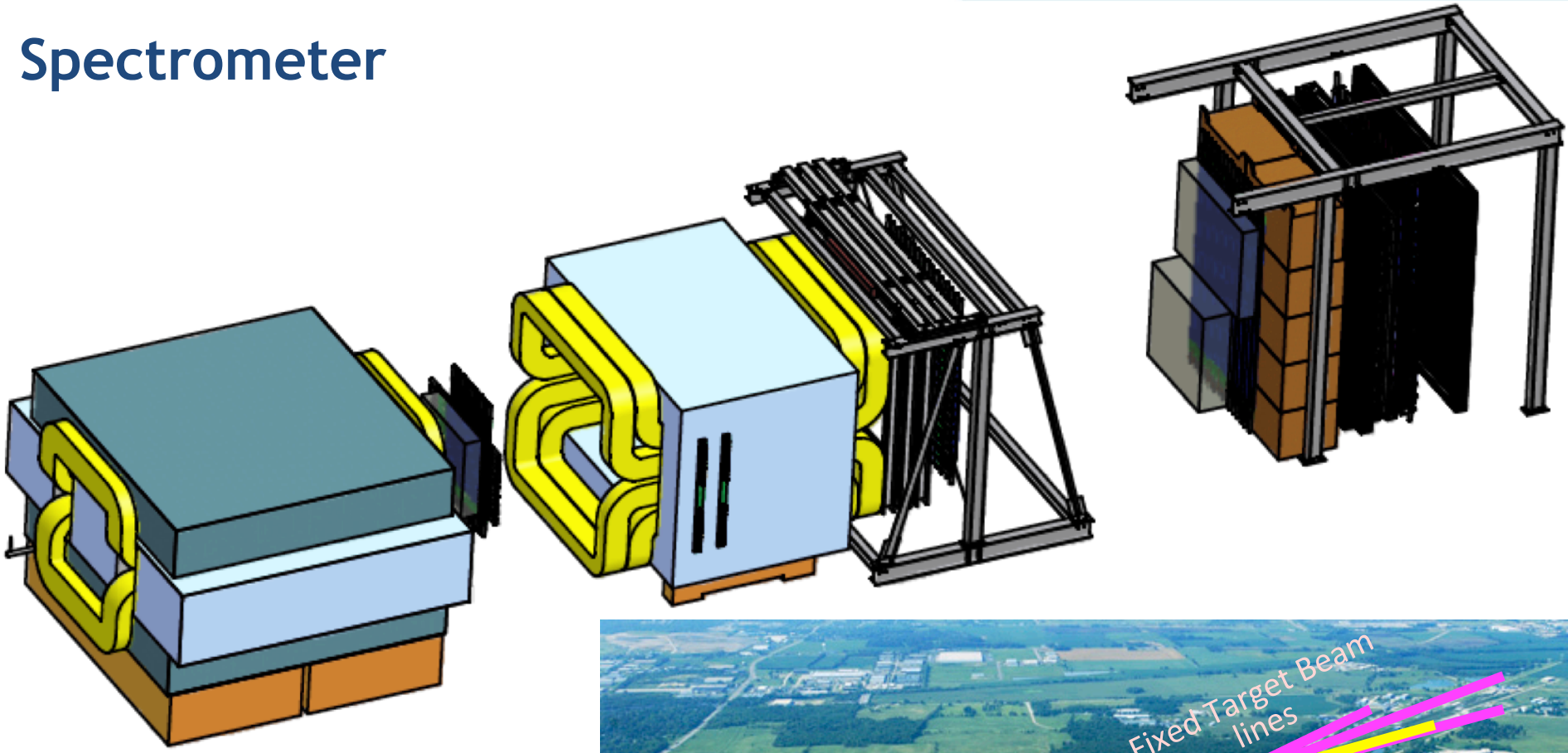


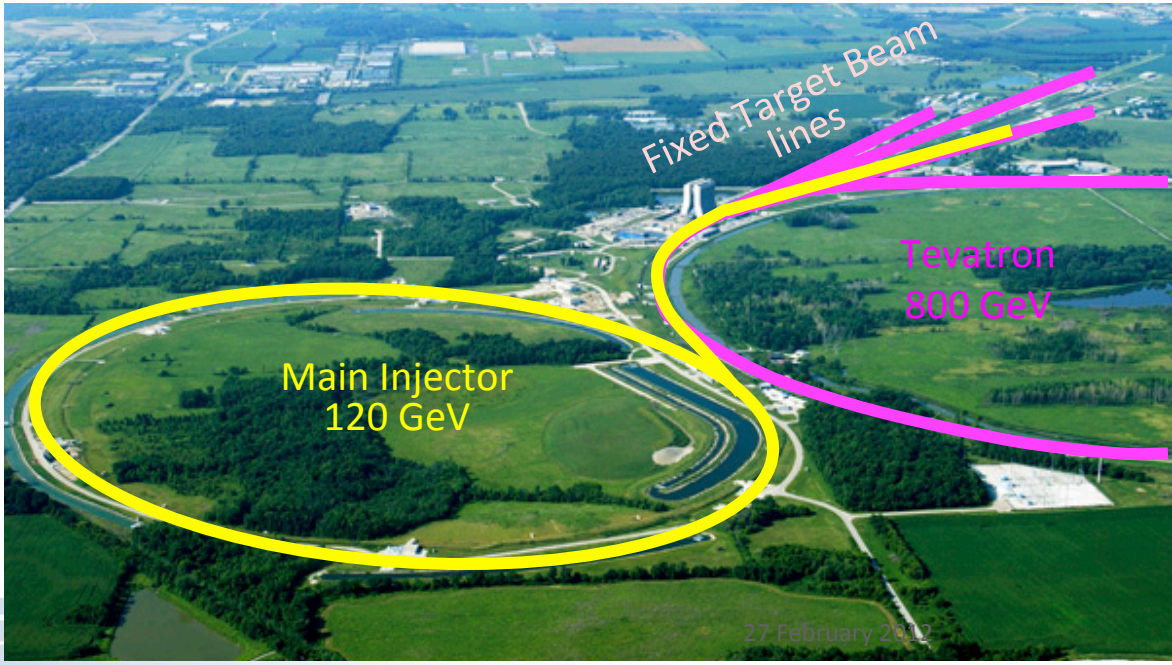
Goals of experiment

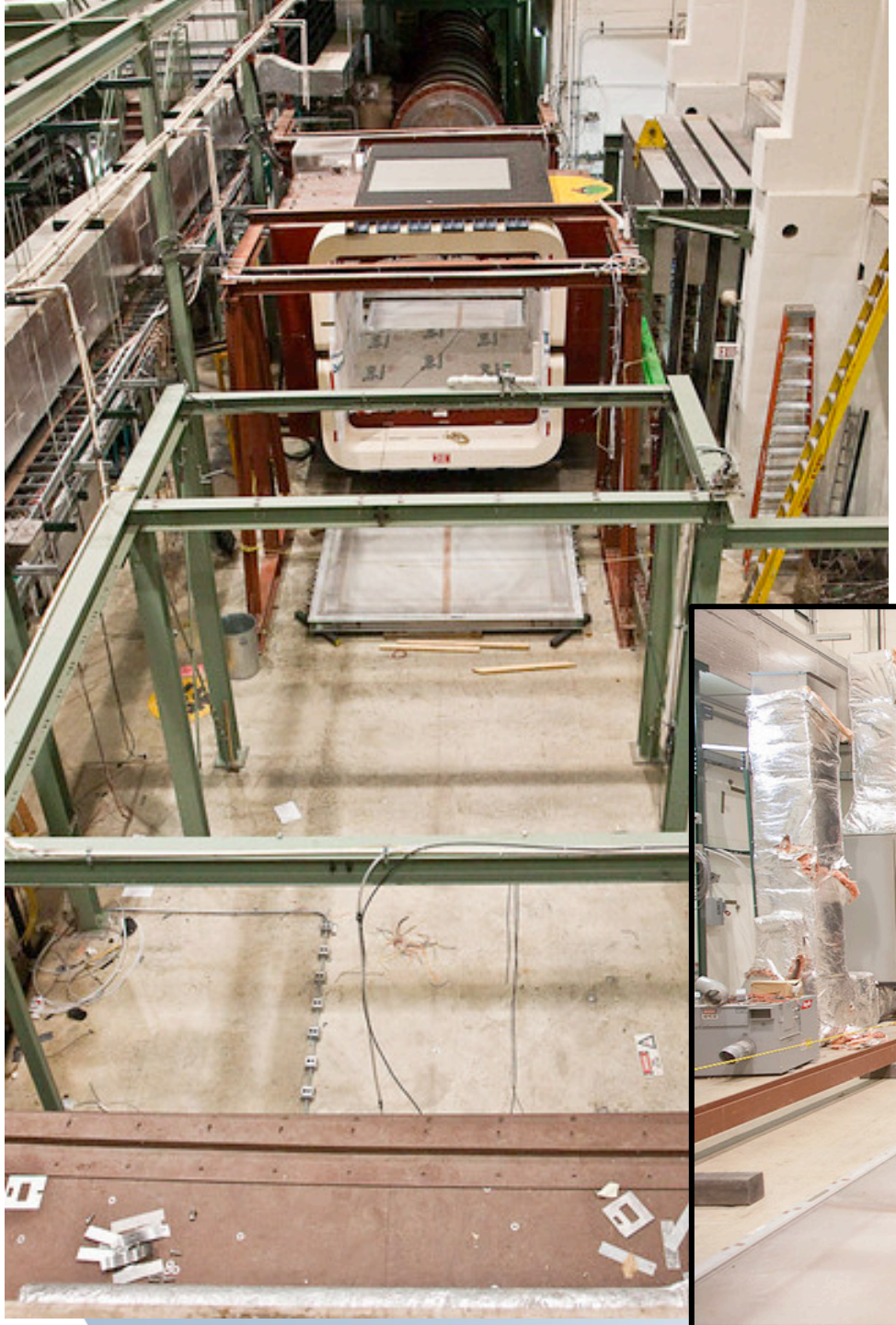


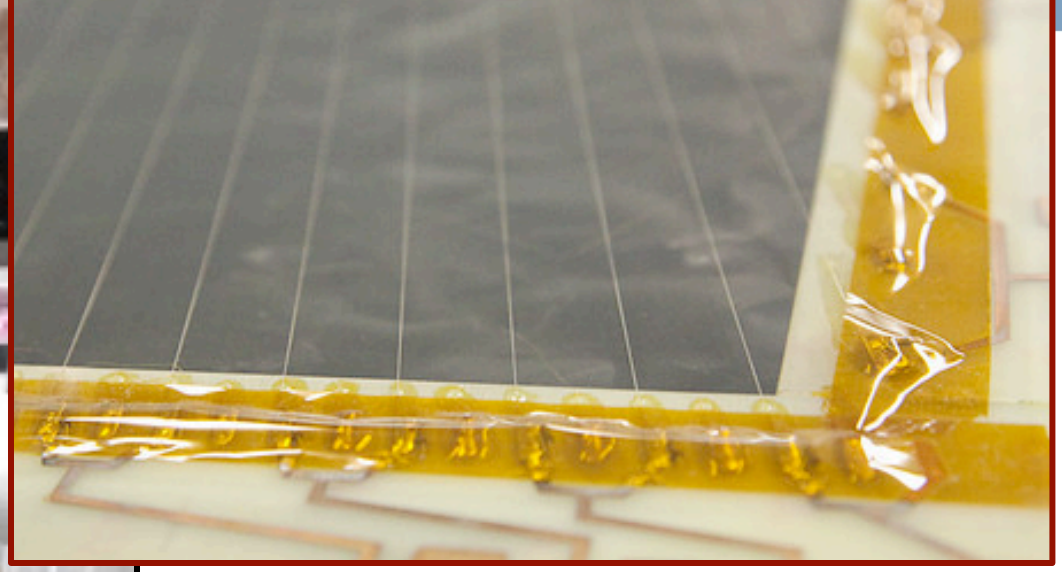


Spectrometer









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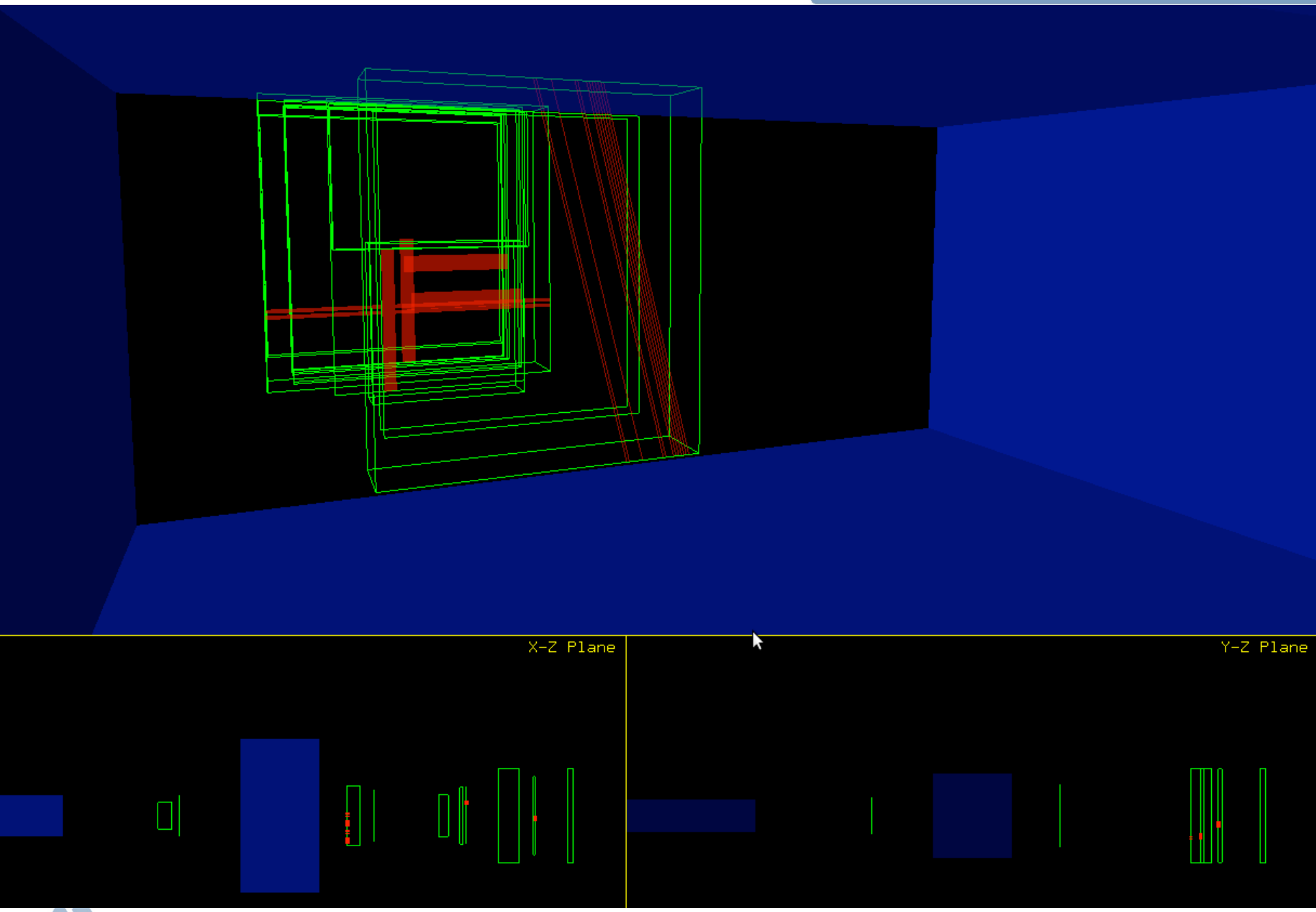
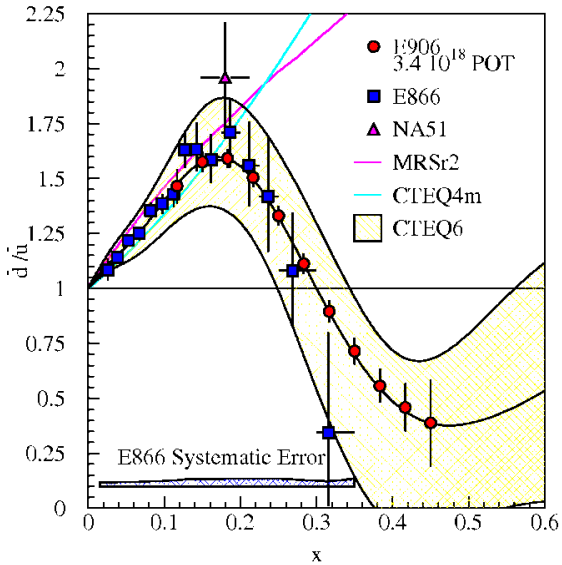
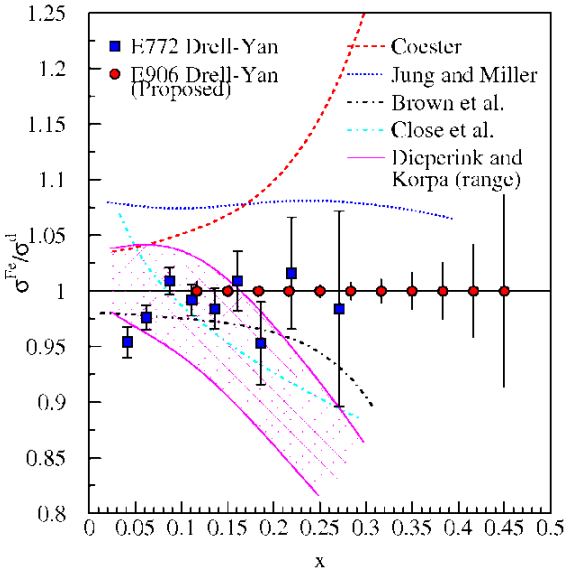

X-Z Plane
Y-Z Plane

What to do with the beam between now and ~30 April?

2 Goals:

1. **Prove that the apparatus can achieve performance necessary for full physics goals and learn what can be better optimized**

2. **Provide Thesis Data for Graduate Students**

The SeaQuest Plan:

- Begin Commissioning w/beam as soon as we see evidence of Muons
  - Efficiencies of Hodoscopes, Triggers, Drift Chambers, etc
  - Repair whatever might not be working
  - Verify Rate Calculations
- Goal 1 & 2 Collect approx. 3 weeks of data on D2 & Fe targets & Fe Beam Dump with Drell-Yan trigger
- Goal 2 Collect approx. 3 weeks of data on D2, Fe and W targets with J/ψ trigger