

Bertini Model Verification

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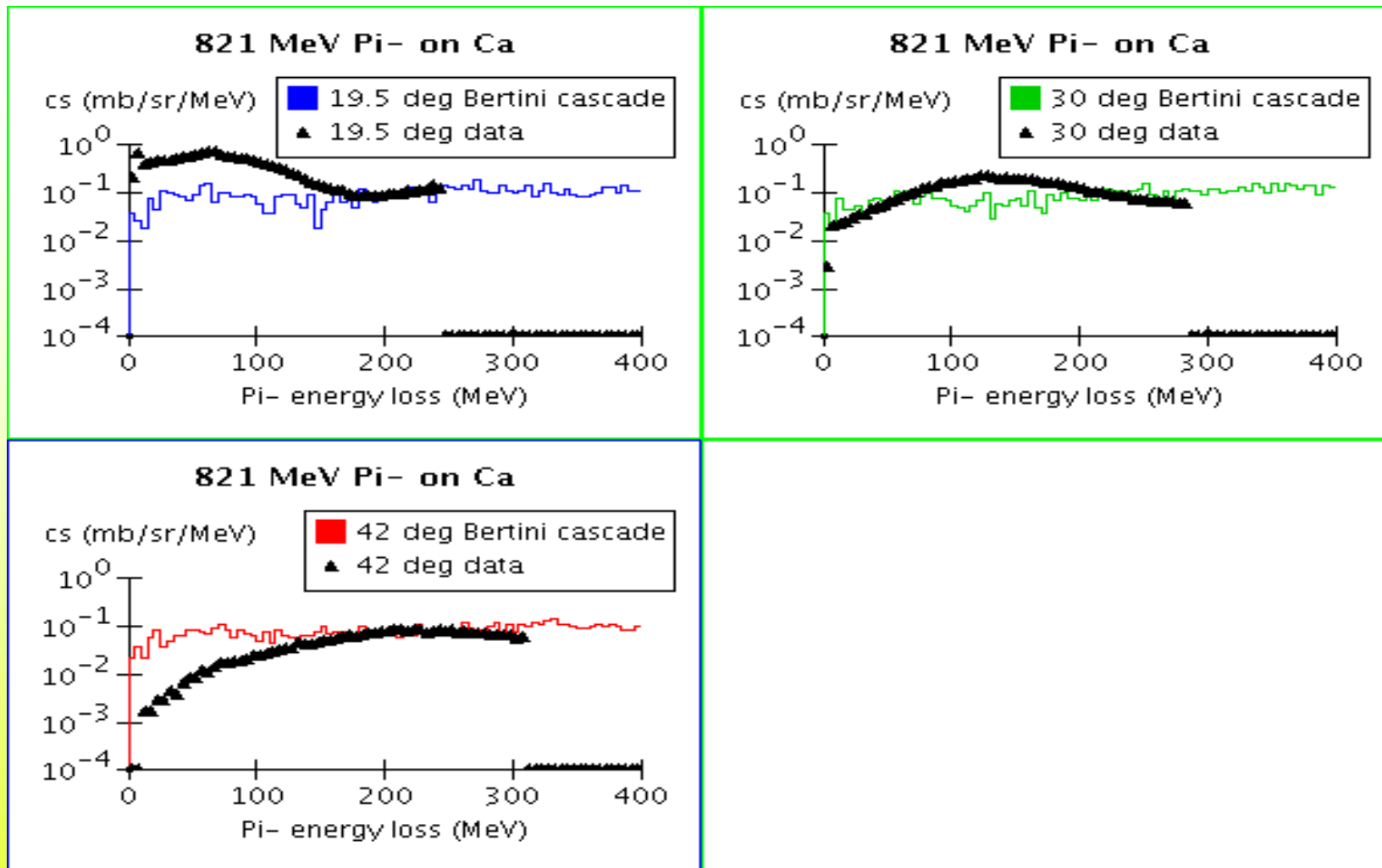
Outline

- Existing verifications
- Required verifications
 - urgent
 - desired
- Data provided by experiments
 - recent results
 - new proposals

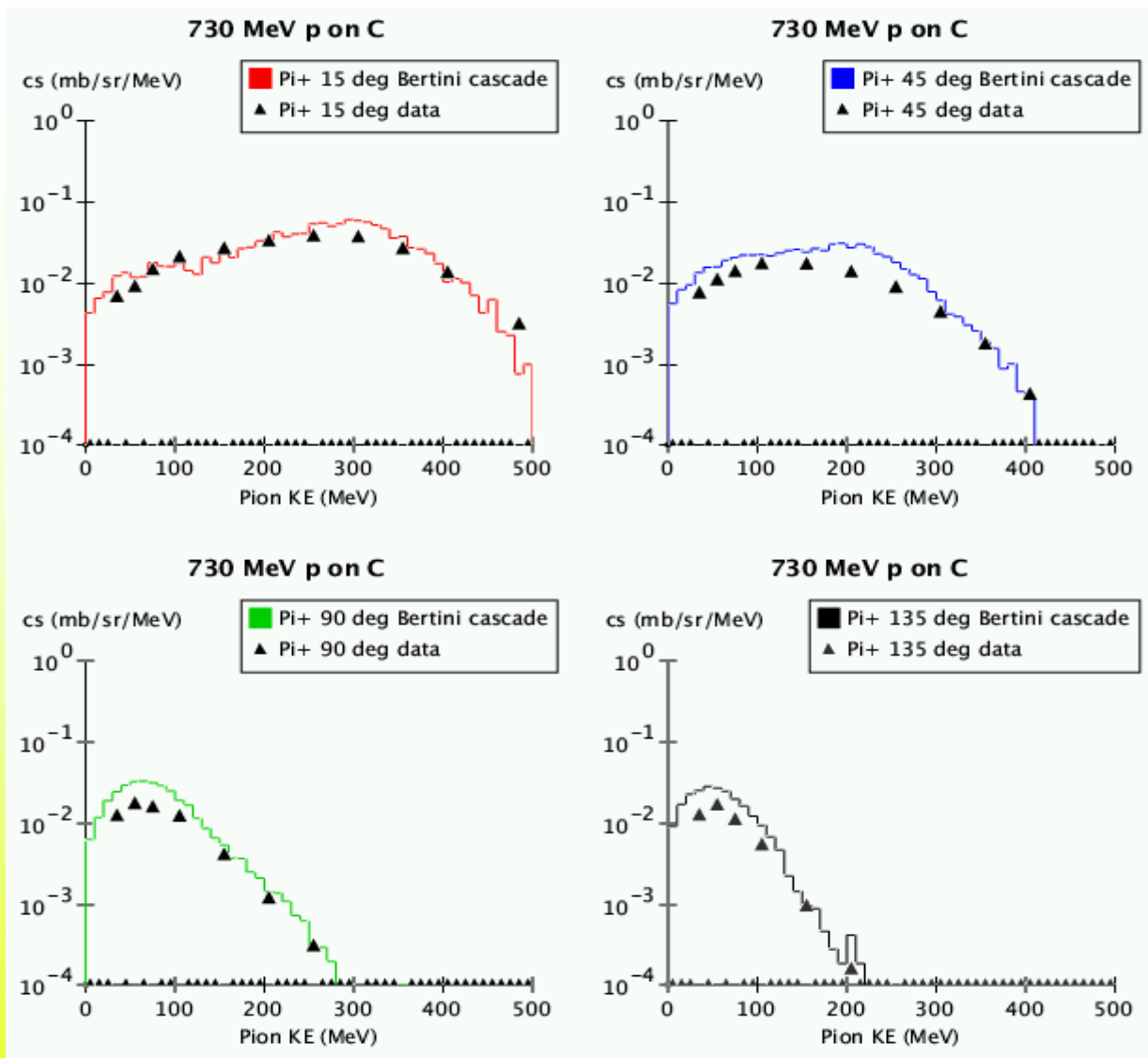
Existing Verifications

- neutron production from 113, 256, 597, 800 MeV protons
 - see Vladimir's plots
- (K^-, π^-) quasi-elastic at 900 MeV/c
- π^- quasi-elastic at 821 MeV (also for binary, LEP)
 - see Dennis' plots
- $\pi^{-/+}$ production from 730 MeV p (also for binary, LEP)
 - see Dennis' plots

π^- quasi-elastic at 821 MeV



$\pi^{-/+}$ production from 730 MeV protons



Required Verifications

- **Most urgent verifications:**
 - anything with $1 \text{ GeV} < \text{KE} < 10 \text{ GeV}$
 - preferably (p, pX) , (p, nX) , $(p, \pi X)$, (π, K) , $(p, \pi X)$
 - $(p, pX) < 1 \text{ GeV}$
- **Less urgent:**
 - (p, K) , (π, K) , (K, π)

Data Provided by Experiments (1)

- 5 GeV/c HARP data (near future)
- McGill et al., Phys.Rev. C29, 204 (1984).
 - 800 MeV p-p, p-d, p-C, p-Ca, p-Pb => $d^2\sigma/d\Omega/dp$
- Shibata et al., Nucl. Phys. A408, 525 (1983).
 - 1.4 – 4.0 GeV/c (π , pX) on C, Cu, Pb
 - 3.0 GeV/c (p, nX), (π , nX) on Cu => invariant d.d. cross section
- En'yo et al., Phys. Lett. 157B, 1 (1985).
 - 4 GeV/c (p, pX), (p, π X) on Al, Pb => inv.d.d. cross section

Data Provided by Experiments (2)

- Niita et al., Phys. Rev. C52, 2620 (1995).
 - 3.17 GeV (p, pX) , (p, pi X) on Al => invar. dd cross section
 - 3, 1.5 GeV (p,nX) on Pb => dd cross section
- Armutliiski et al., Sov. J. Nucl. Phys. 48, 161 (1988).
 - 10 GeV/c (p, pi- X) on C, Ta => invar dd cross section
- Leray et al., Phys. Rev. C65, 044621 (2002)
 - 0.8, 1.2, 1.6 GeV (p, nX) on many nuclei => dd cross section

New and Recent Experiments

- **HARP**
 - data below 10 GeV available in near future
- **MIPP**
 - 5 – 85 GeV/c beams of $\pi^{+/-}$, $K^{+/-}$, p, pbar
 - wide range of A
 - recently finished run (publications ?)

Summary

- Neutron production well validated for $E = 800$ and below
- Some verification done for pi, K at ~ 800 MeV
- Need verification in range $1 \text{ GeV} < E < 10 \text{ GeV}$
- Data available for
 - 1.2, 1.4, 1.6, 3.0, 3.17, 4.0, 10.0 GeV
- MIPP may soon have data below 10 GeV
- HARP may soon have 5 GeV data