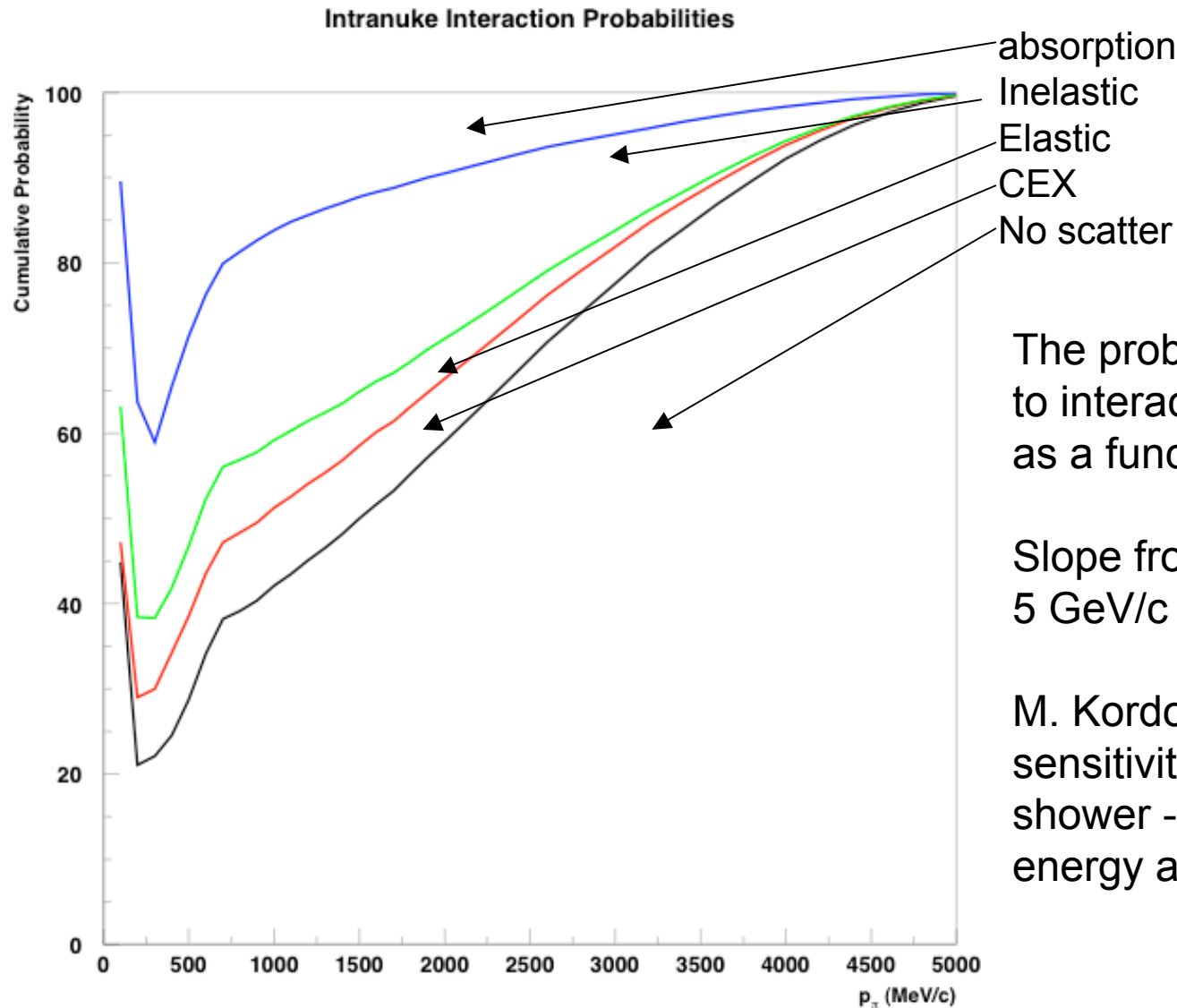


Pion Absorption in INTRANUKE

H. Gallagher
MINOS Phone Meeting
July 13, 2005



The probability for a pion to interact in an iron nucleus as a function of p_{π} .

Slope from 500 MeV/c to 5 GeV/c is formation zone.

M. Kordosky studies show little sensitivity to makeup of hadronic shower --> emphasis on energy absorption.

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Previous when a pion was absorbed, the energy was assumed to disappear from the point of view of the simulations.

Model for the process now based on, with suggestions also by Steve Dytman:
R. Ransome, "Pion absorption and re-scattering",
Nucl.Phys.Proc.Suppl.139:208-212,2005

Suggestions are based on the measurements by the BGO ball at LAMPF and the LADS detector at PSI which studied positive pion absorption up to 500 MeV/c on a variety of nuclear targets.

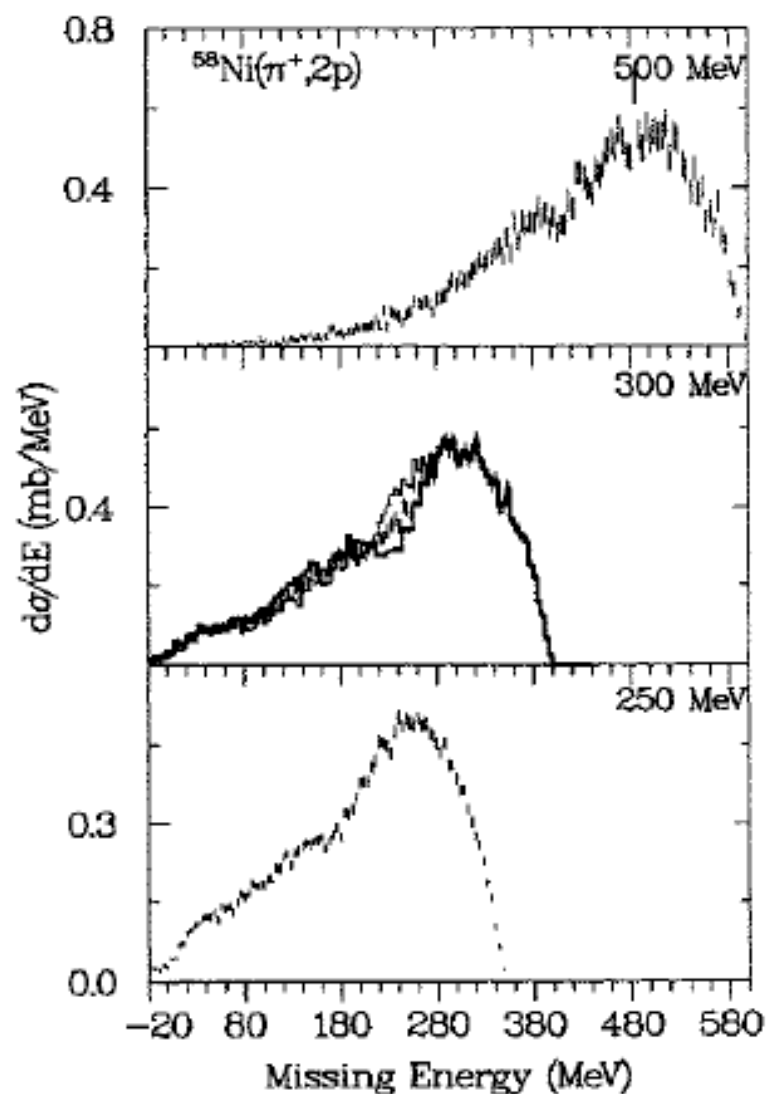
Fundamental process is pion absorption by a multi-nucleon cluster, pn or pnn.
Rescattering on the way out tends to produce ppnn states.

For an absorbed pion, replace it by 4 nucleons (2p, 2n) outside the nucleus:

- 1) Divide its total energy equally into the KE of 4 nucleons in the CM
- 2) Place these in a plane separated by 90°
- 3) Boost back to the lab

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Missing energy for π^+ absorption on ^{58}Ni .

“Two-body absorption with small final state interactions, which would appear as a narrow peak near zero missing energy, is *not* very significant” - Ransome

Model effectively short-circuits the cascade approach but gives something in the end directly based on the measurements.

Could study sensitivity to:

- 1) Ppnn vs. ppn, pnn etc final states
- 2) Energy re-distribution scheme

If large effects are seen in first studies.

M. K. Jones et al,
Phys. Rev. C 48 (1993) 2800.
As shown in Ransome. Nucl.Phys.Proc.Suppl.139:208-212,2005