TUNL Program on PREEQUILIBRIUM PHENOMENOLOGY

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PROGRAM

- Exciton preequilibrium model & code
- Suitable for (nucleon,nucleon) rxns at 14 -100 MeV
- Reactions with complex particles require add'l direct reaction models
- PRECO-2000 distributed
- Working toward PRECO-2005 (I hope!)

AREAS OF RECENT STUDY

- Additional work on complex particle channels
  - Neutron induced reactions (cont'd)
  - Role of projectile breakup
- Programmed default for isospin cons'v'n
- Journal article on complex particle channels completed

NEUTRON INDUCED REACTIONS

- Adjust overall NT normalization:

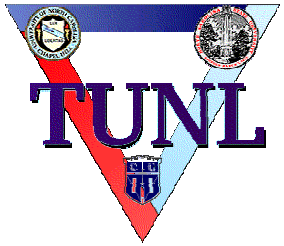
  $(5500/A_A)^n$

- Excitation of add'l p-h pairs in nucleon transfer:

  Verify that norm. depends on $1/V_{eff}$

- Verify trends in V_{eff} from (n,xp) rxns

  Larger V_{eff} for heavy targets as E_{inc} increases [surface $\rightarrow$ volume]


TUNL

NUCLEON TRANSFER

- Exponent on $(2Z/A)$ normalization factor

  Combine results from full database

  $2(Z_a+1)h_\pi + 2p_\nu$

  Neutron excess hinders

  proton pickup

  neutron stripping

ROLE OF PROJECTILE BREAKUP

- Fragments emitted at projectile velocity
- Reduces cross section to exciton model
- Change in initial exciton model config?

  currently: $p_0,h_0 = A_a+1,1$

  possible: $p_0,h_0 = A_a,0$

FUTURE WORK NEEDED!

(not yet included in PRECO)

COMPARISONS − Neutrons at 63 MeV

COMPARISONS − Protons at 63 MeV

COMPARISONS – Deut. at 70-80 MeV

COMPARISONS − Alphas at 140 MeV

FUTURE WORK

- Write article on isospin conservation
- Add auxiliary states in exciton model residual state densities
- Formulate breakup model and include in PRECO; study impact on exciton model
- New release of PRECO

TIME REQUIRED? PRIORITIES?