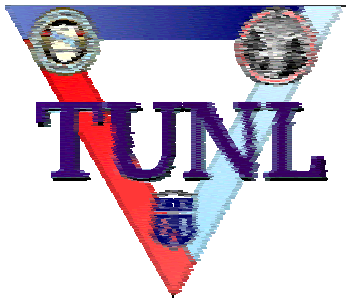
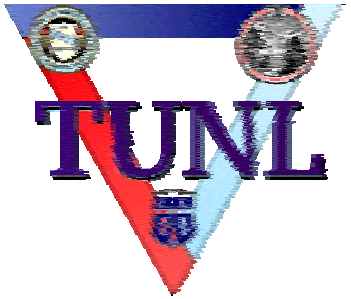


TUNL Program on PREEQUILIBRIUM PHENOMENOLOGY

Constance Kalbach Walker

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-2004



AREAS OF CURRENT STUDY

- Surface localization in neutron induced reactions
- Nucleon transfer phenomenology
  - New data on neutron induced reactions
- Conditions for isospin conservation

SURFACE LOCALIZATION

- Neutron induced reactions 28-63 MeV
  - new data from Louvain-la-Neuve
- Found apparent difference between (n,p) and (n,n')
- Needs to be verified with additional data
  - (n,n') at higher E_{inc} and more (n,p)

Neutron V_{eff}

(n,n): V_{eff} = 7 MeV

(n,p): $V_{eff} = 7 + 5.2E_{inc}\,[(N-Z)/A]^2$

NUCLEON TRANSFER

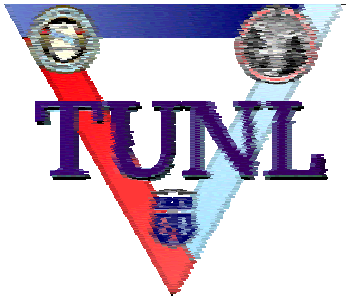
- Most work this year is on incident neutrons
  - New data from Louvain:
  - E_{inc} = 28 - 63 MeV
  - Targets of (Al), Si, Co, Bi, U
- Verifies incident proton results
  - Different overall normalization
  - Answers some open questions

ISOSPIN CONSERVATION

- Previously studied
  - (p,p') and (p,n) preequilibrium
  - (p,complex) preequilibrium
- Added equilibrium information
- Confirms: T conserved for $E < 4E_{sym}$
- Indicates T 40% conserved at equilibrium

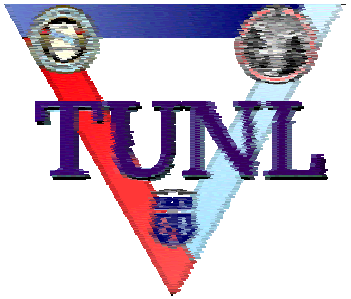
T-conservation summary

equil. results →

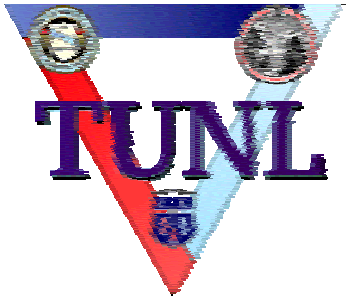


EXCITON STATE DENSITIES

- Some states are not getting counted
  - Due to Fermi level moving up and down during CN formation and emission
- Needs further work
  - most important for low A and low E

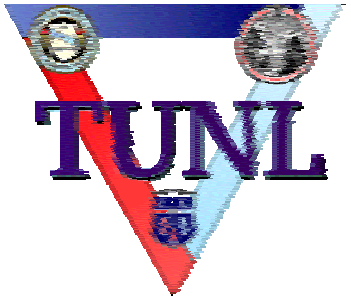


Adding missing residual states



PROGRAM STATUS

- Paper on surface localization submitted
- Paper of complex particle channels nearing completion (I think!)
- Started on paper on isospin conservation



FUTURE WORK

- Complete papers
- Do work on missing exciton states
- Prepare new release of PRECO