TUNL Program on PREEQUILIBRIUM PHENOMENOLOGY

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PROGRAM

- ➢ Exciton preequilibrium model & code
- ➢ Reactions with complex particles require add'l direct reaction models
- ➢ Working toward new release of PRECO

YEAR OF CONSOLIDATION

➢ Paper on complex particle channels published in Phys. Rev. C (Mar)
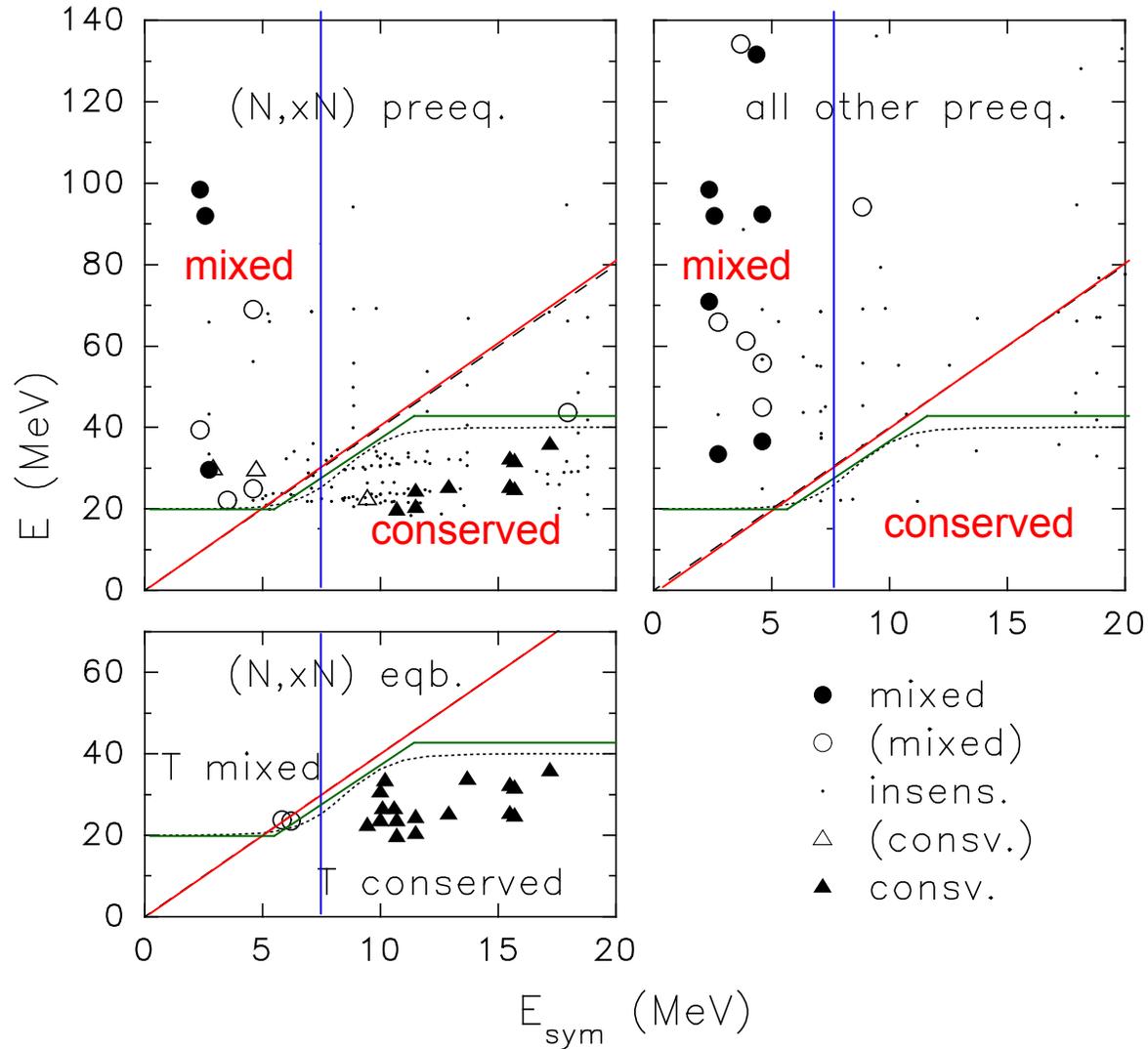
(Results presented here last year)

YEAR OF CONSOLIDATION

➢ Results on isospin conservation put into context of results from other types of studies

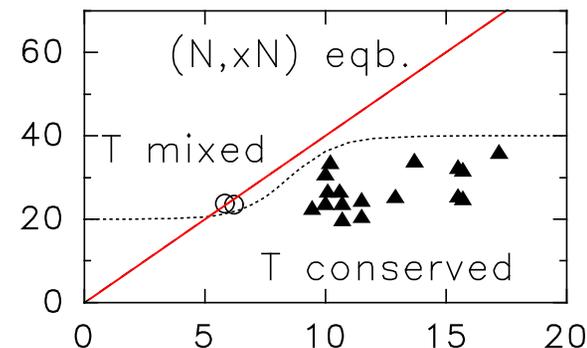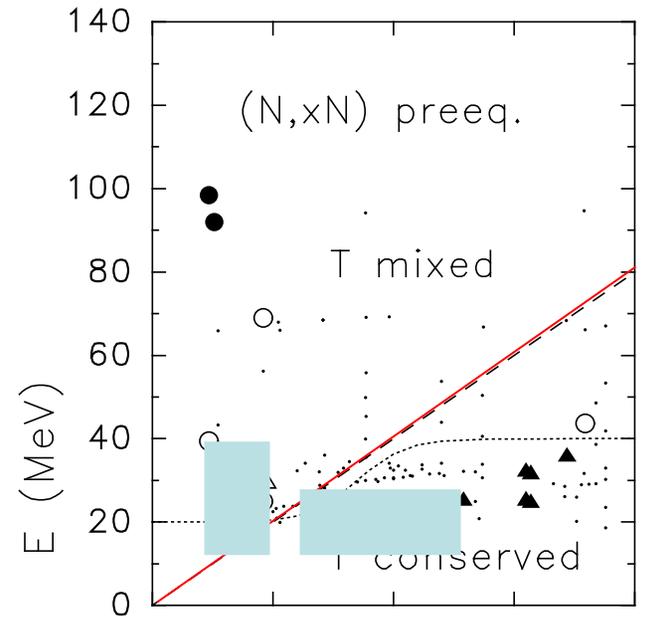➢ Article on isospin conservation written and published in Phys. Rev. C (Aug)

Isospin

Isospin

Much is unknown

Consistent with CN studies

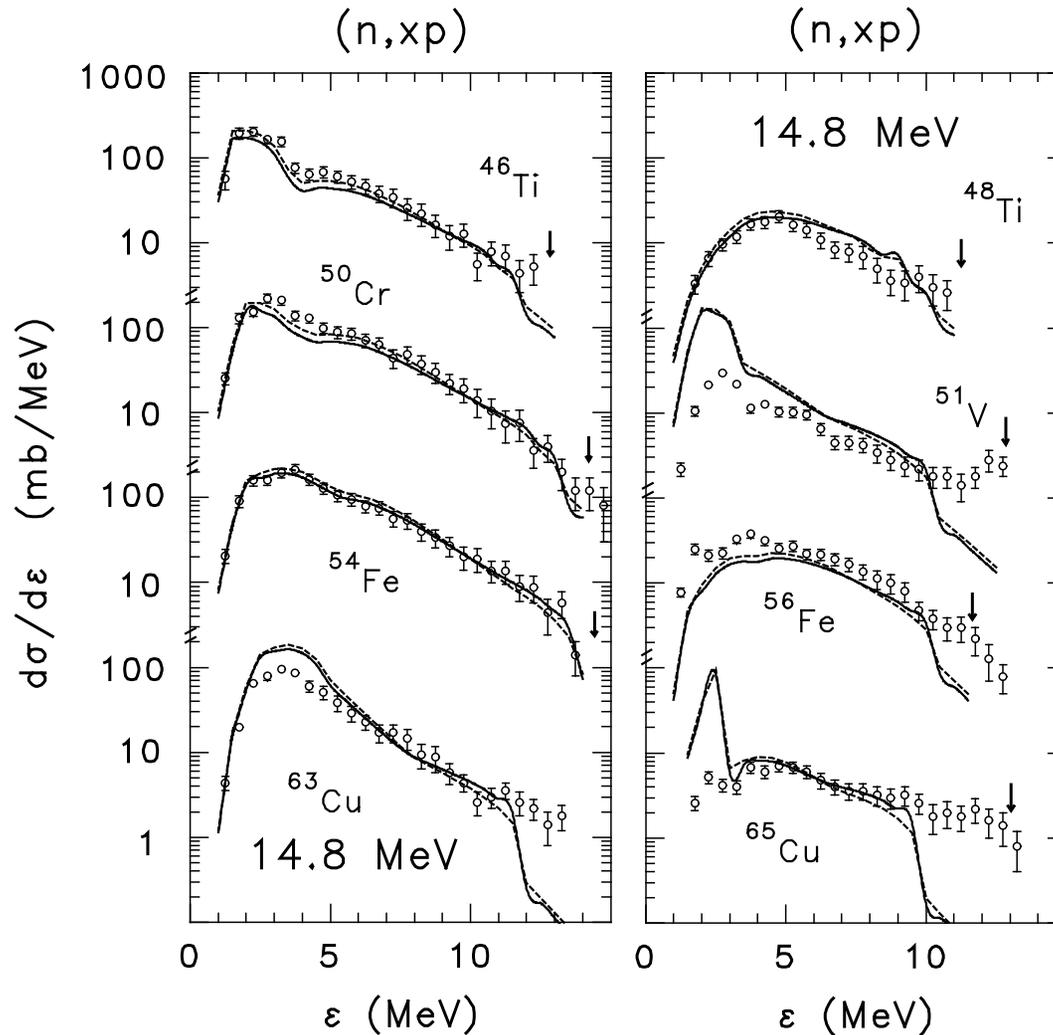Conflict with studies on $T_z = 0$ nuclei with H.I. rxns or GDR prod

YEAR OF CONSOLIDATION

➢ Work on uncounted residual nucleus states generalized for complex particle channels; solving endpoint problem

➢ Article on missing residual nucleus states written and submitted to Phys. Rev. C. (preprint available)
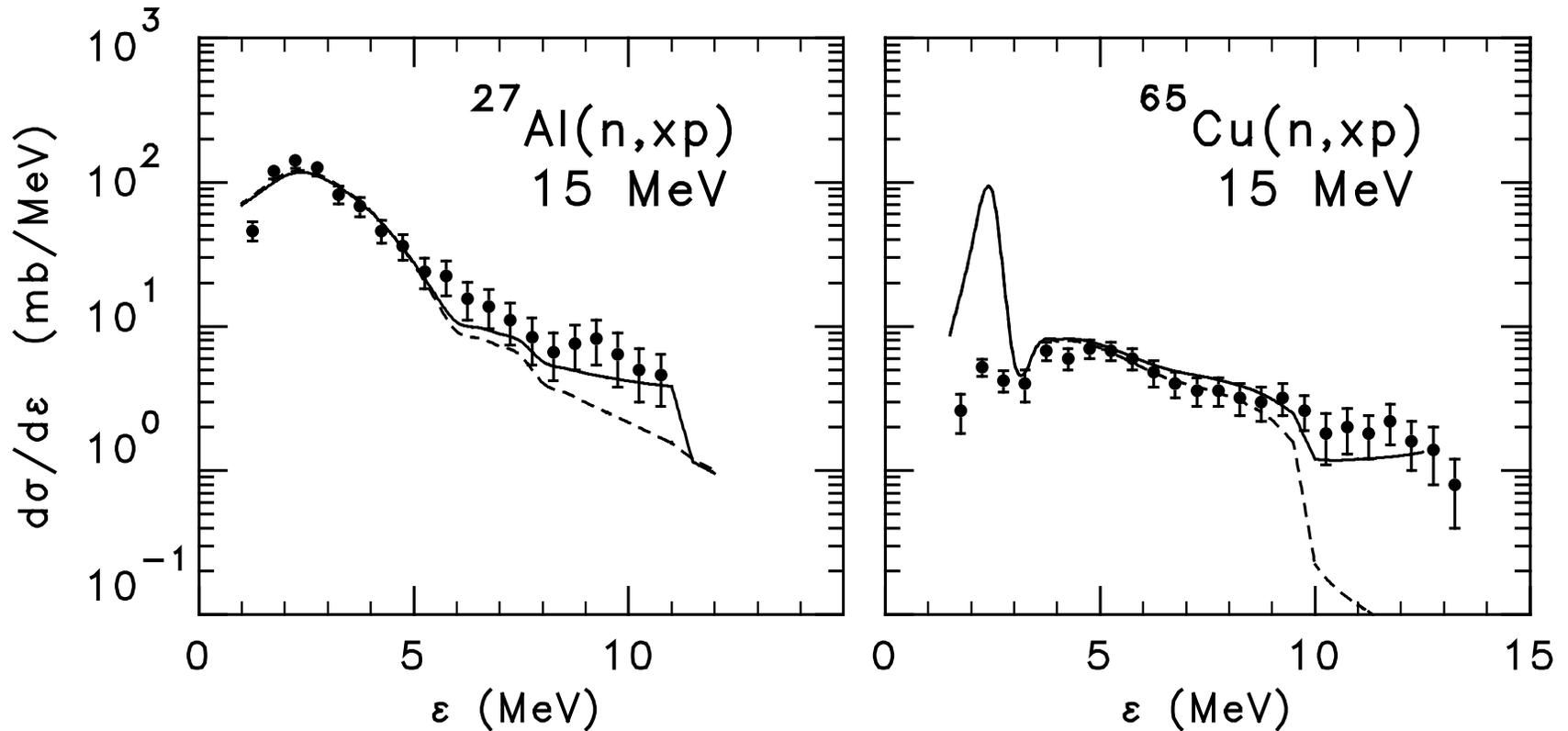
Missing residual states

Missing residual states

Fermi level moves down during emission;
Some hole s.p. states become particle states;
Some residual nucleus states not counted.

$$\omega_{eff}(p_\pi, h_\pi, p_\nu, h_\nu, U) =$$

$$\sum_{i=\min(p_\pi, h_\pi)}^{h_\pi} \sum_{j=\min(p_\nu, h_\nu)}^{h_\nu} \omega(p_\pi, i, p_\nu, j, U)$$

Effects largest if E_{PAULI} has large shell or pairing corrections for emitted nucleon type

Missing residual states

Missing residual states

Results extended to complex particles

Effects largest for

      Light targets

      $Z_b > Z_a$ and/or $N_b > N_a$

      Pairing or shell corr'ns large

Endpoint effects obscured by direct rxn components

See intensity increase (up to 40-50%) in lower half of spectrum

FUTURE WORK ?

➢ New release of PRECO

➢ Study energy dependence of collective excitation model

➢ Extend breakup model to He-3 and α
Include in PRECO
Absorbed fragment to initiate exciton model calculation
(Unique strength of PRECO)

TIME REQUIRED? PRIORITIES? FUNDING?

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