TUNL Program on PREEQUILIBRIUM PHENOMENOLOGY

Constance Kalbach Walker
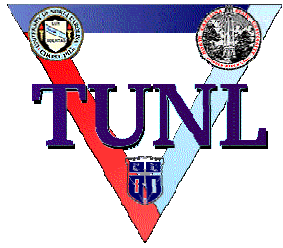
PROGRAM

➤ Exciton preequilibrium model & code

➤ Reactions with complex particles require add'l direct reaction models

➤ Working toward new release of PRECO

EFFECT OF FUNDING CUT

➢ Reduced level of effort

➢ More time on reviewing activities
      Journal articles,
      Thesis from India

➢ Less rush to get PRECO-2006 out
      Smoothing out small issues
      Adding small features
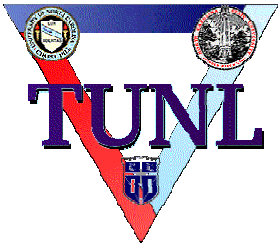
WORK ON PRECO-2006

➢ Users manual complete
  except for last minute code changes

➢ Added option for printing
  production cross sections (total or preeq.)

➢ Began prep of sample input/output files

➢ Began cleaning up code
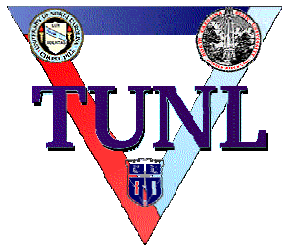 remove dead coding / update comments
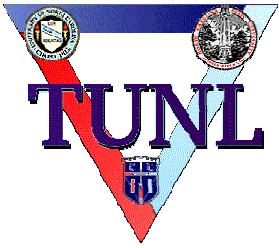
PARAMETER COUPLING

➢ Strong coupling between g_0 (s.p. state density) and matrix element normalization

➢ Pair creation rates:

$$\lambda_+(p, h, E) = \frac{2\pi}{\eta} M^2 \frac{g_0^{\,3} E^2}{2(p + h + 1)}$$

➢ Mean square matrix elements:

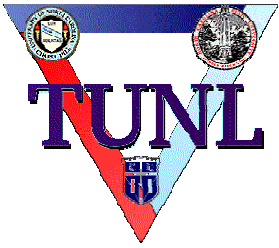$$M^2 \propto A^{-3}(E + 21)^{-3} \rightarrow$$

$$M^2 \propto g_0^{\,-3}(E + 21)^{-3}$$
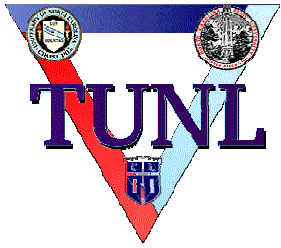
LOOSE ENDS
(possibly coupled effects)

➢ Under-estimation of inelastic spectra
   at high incident and emission energies
   (collective model problem?)

➢ Apparent difference in V_{eff} for inelastic and
   exchange channels
        esp. at high A and higher E_{inc}

➢ Possible need for asymptotic value of M^2

(seeking way to resolve all of these together)

FUTURE WORK ?

➢ New release of PRECO

➢ Study loose ends

➢ Extend breakup model to He-3 and α
  Include in PRECO
  Absorbed fragment to initiate exciton model calculation
  (Complex particle channels are a unique strength of PRECO)

➢ ...

☺