Next things to do
~ neut ~

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Next things to do #1 ~ Primary interactions

1) Interactions on deuteron ( Neut does not support D so far.. )
2) Quasi-elastic – like ( incl. multi-particle interactions )
   Implement Local Fermi gas with RPA correction
   a) R. Gran, J. Nieves, F. Sanchez, MJ Vicente Vacas
   b) M. Martini, M. Ericson
   TEM model
   A. Bodek, M. E. Christy, B. Coopersmith
3) Single pion production
   ( not near term ) Nakamura – Sato model
4) Single K production
   strangeness violating process
5) Single \( \eta \) production
   new model ( currently using resonance decay
   using Rein-Sehgal resonance production )
6) Deep inelastic scattering
   Updated Bodek-Yang correction
Next things to do #2 ~ Secondary interactions & others

1) pion interactions in nucleus
   Validation of the kinematics
   Still using rather old “medium correction” on the pion phase shift analyses results
   Validation of the interactions in high momentum region
   \[ P_\pi > 500 \text{ MeV/c} \]
   Model with higher resonances (available??)
   Uncertainty of the multiplicity from high momentum pions
   (simple cascade model may produce large number of pions from high momentum pions)

*Interactions of energetic pions are getting important for the study of mass hierarchy, octant, and CPV using a few GeV atmospheric neutrinos.*
Next things to do #2 ~ Secondary interactions & others

2) nucleon re-scattering
   Current model is so simple.
   Correct (better) way to “justify” the current model
   and/or “evaluate” uncertainties
   Implement more “realistic” model

*nucleon emission and re-scatterings are important*
   *not only for the study of accelerator neutrinos*
   *and also in the proposed SK upgrade*
   *to add Gd in the water.*

* (Neutrons are captured by Gd*
  *and # of neutrons will be another interests in the analyses. )*

3) Radiative correction
   Additional gamma emission other than leptons
   Code is almost ready (K. Iwamoto & K. McFarland)
   and will be included soon.