

Towards GENIE v3.0.0

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Physics Models

- New PCAC coherent model implementation (*Perdue*)
- Microscopic coherent model implementation (*Scully, Dennis, Boyd*)
- Spectral function model deployment (*Furmanski, Andreopoulos*)
- New Np-Nh model (Nieves et al) implementation (*Schwehr*)
- Inelastic single Kaon production (Athar et al) generator (*Marshal, Nirkko*)
- $\Delta S=1$ QE (*Gallagher*)
- FSI model updates (*Dytman, Ransome, Geary, Betancourt, Blaszczyk*)
- GENIE interface to Geant4 cascade (*Andreopoulos, Liverpool RA, Perdue*)
- High-energy extension for IceCube (*Hoshina, Koskinen, Clark*)

Nearly there **Needs a bit of work** **Needs work** **Needs serious work** **Not in v3.0.0**

Physics Models

- Effective spectral functions (Coopersmith, Bodek et al.).
- Radiative decays below the pion production threshold (Shukraft).
- Coherence length (Christodoulou).
- New formation zone modelling (Hatzikoutelis).
- RPA (?)
- New resonance form factors (Dytman, Alvarez-Ruso)
- Updated Bodek-Yang model (Gallagher?)

Nearly there Needs a bit of work Needs work Needs serious work Not in v3.0.0?

Physics Models

- AGKY single eta production (Gallagher, Ji)
- AGKY+Resonances: Non isotropic 2-body hadronic decays
- AGKY: Forward/Backward asymmetry
- Interface to PYTHIA8 (Andreopoulos, Liverpool RA)
- Tau polarization in cross-section calculations (?)
- Interface to better tau decay routines (?)
- ...?

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Tunes

- Hadronization retuning (Andreopoulos, Grant, Liverpool RA, Liverpool PhD)
- Transition retuning (Andreopoulos, Grant, Liverpool RA, Liverpool PhD)
- ...?

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Tools

- Std generator/theory interfaces (Mrenna, Stainer, Gallagher, Andreopoulos).
- Coherence length systematic (Christodoulou).
- New FSI systematics (Grant, Cherdack).
- Hadronization systematics - Exact method (Norrick, Meyer).
- Hadronization systematics - Covariance matrix method (Andreopoulos).
- Upgrade of the hadronization validation tools (Yarba).
- Systematics/fitting in hadronization validation tool (Andreopoulos, Liv. PhD)
- Fix known problems with resonances in eA validation (?)

Tools

- MB comparisons in GENIE validation framework (?)
- Automated validation (Perdue, Yarba, Andreopoulos).
- Global configuration persistency (Andreopoulos)
- Deployment of GSL interfaces. Retire old numerical code (Dennis)
- Efficient kinematic selection for several slow models: Metropolis-Hastings, importance sampling (Andreopoulos, Boyd, Dennis, others)
- Experimental interface upgrades (many)
- ...?