

Forward Physics Facility 3rd Meeting

GENIE

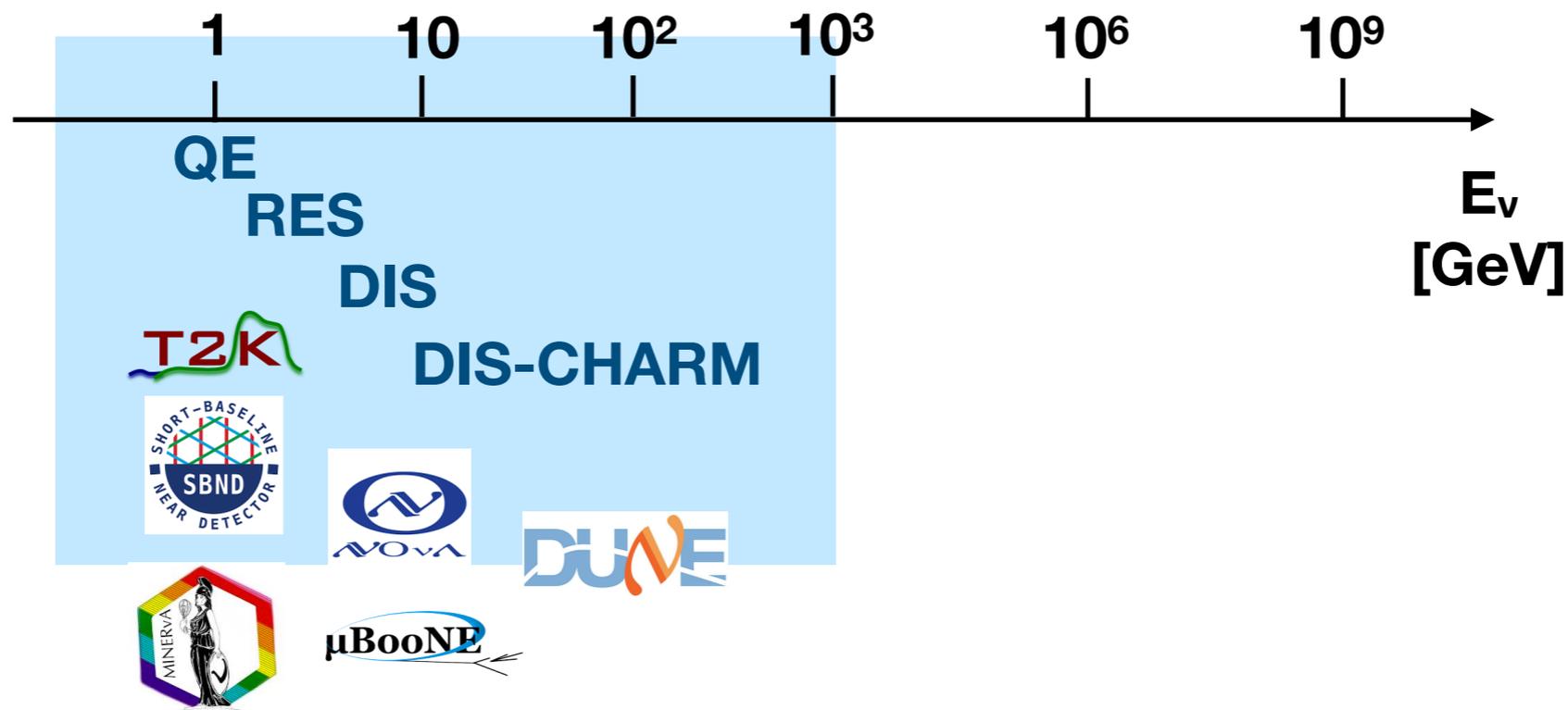


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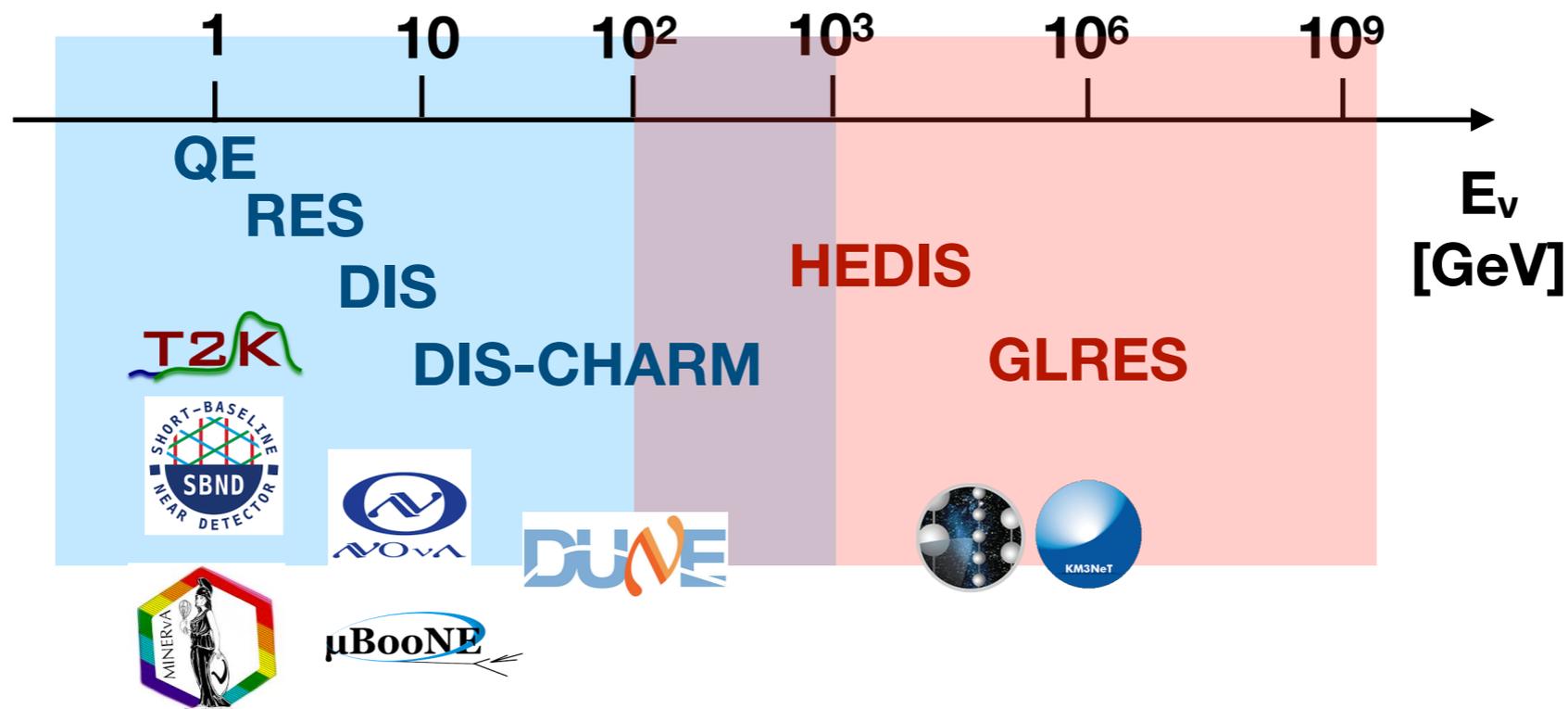
GENIE

- Widely used by long baseline experiments:
 - Tunes -> different models can be implemented.
 - Reweight -> propagate model uncertainties.
 - Relevant in the few GeV regime.



GENIE

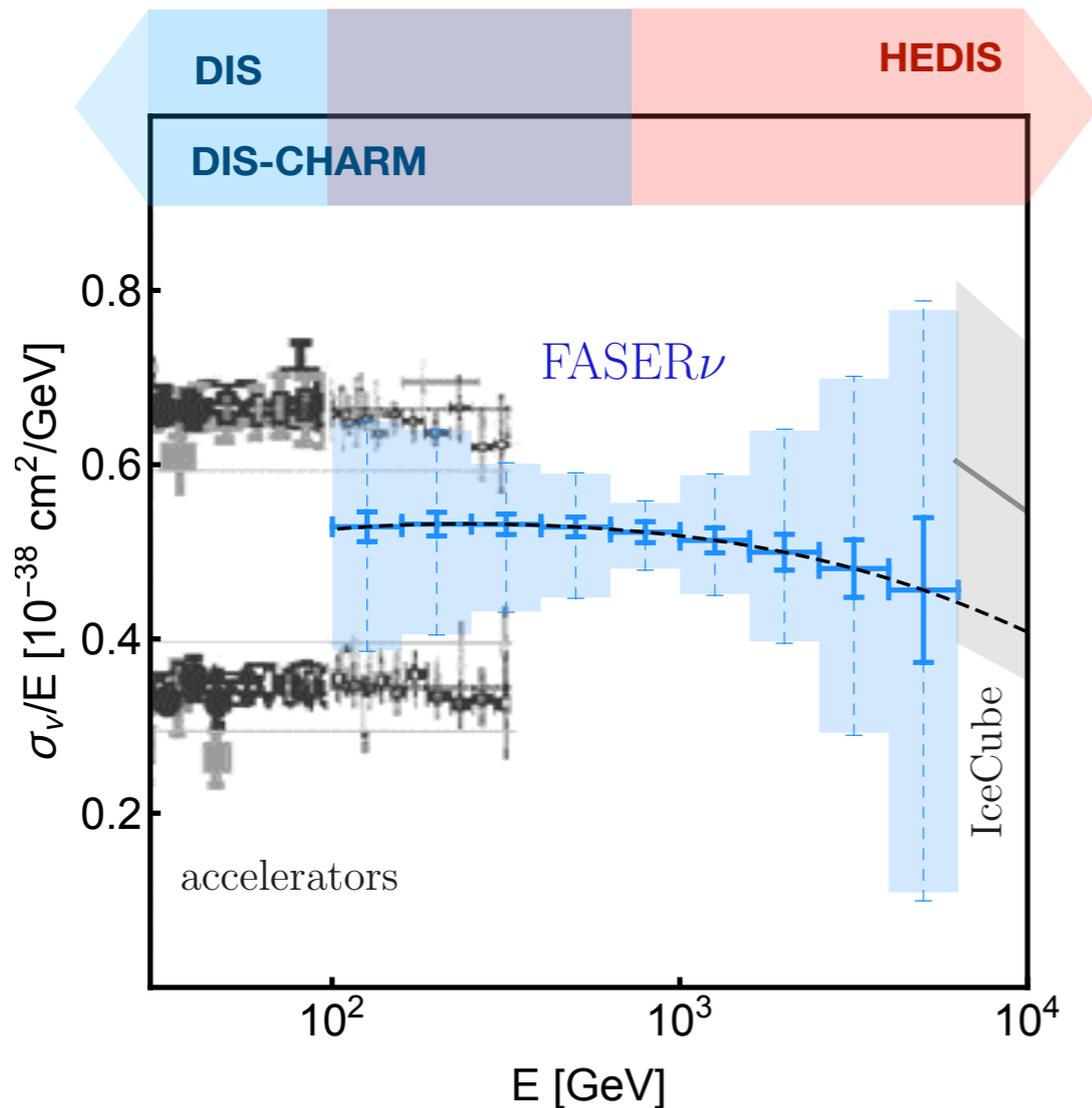
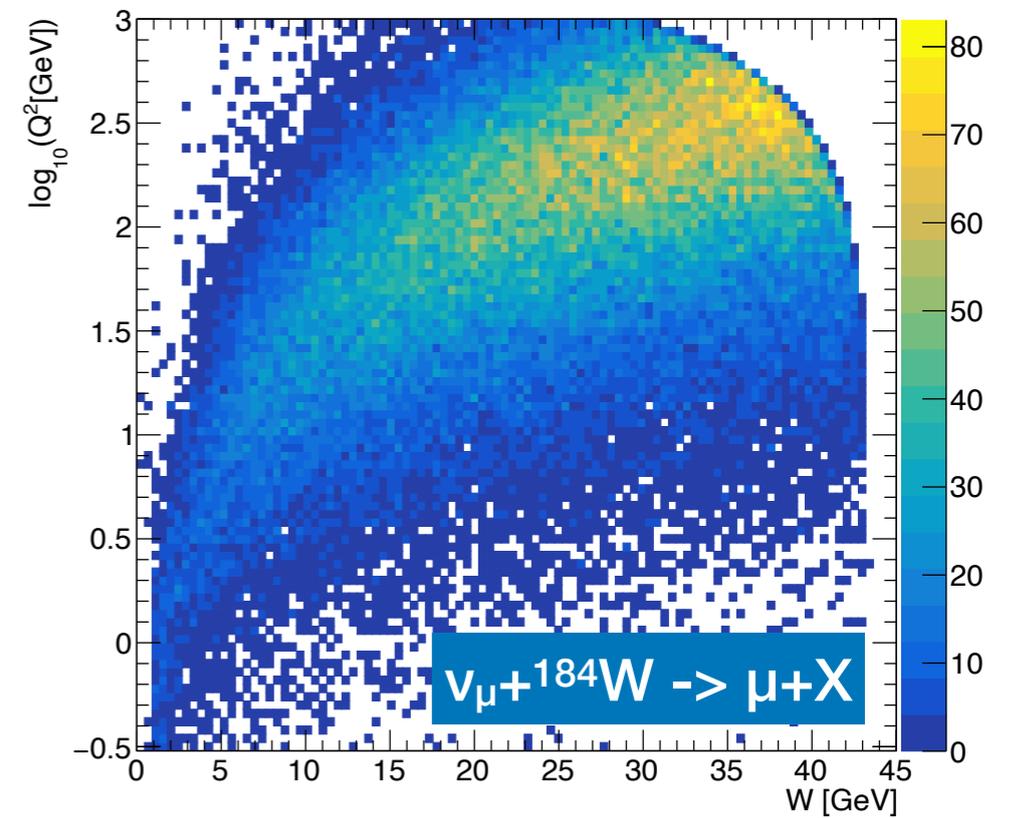
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- New community -> neutrino telescopes
 - Mainly focused in the TeV-PeV range.
 - Different requirements wrt LBE.

Cross section

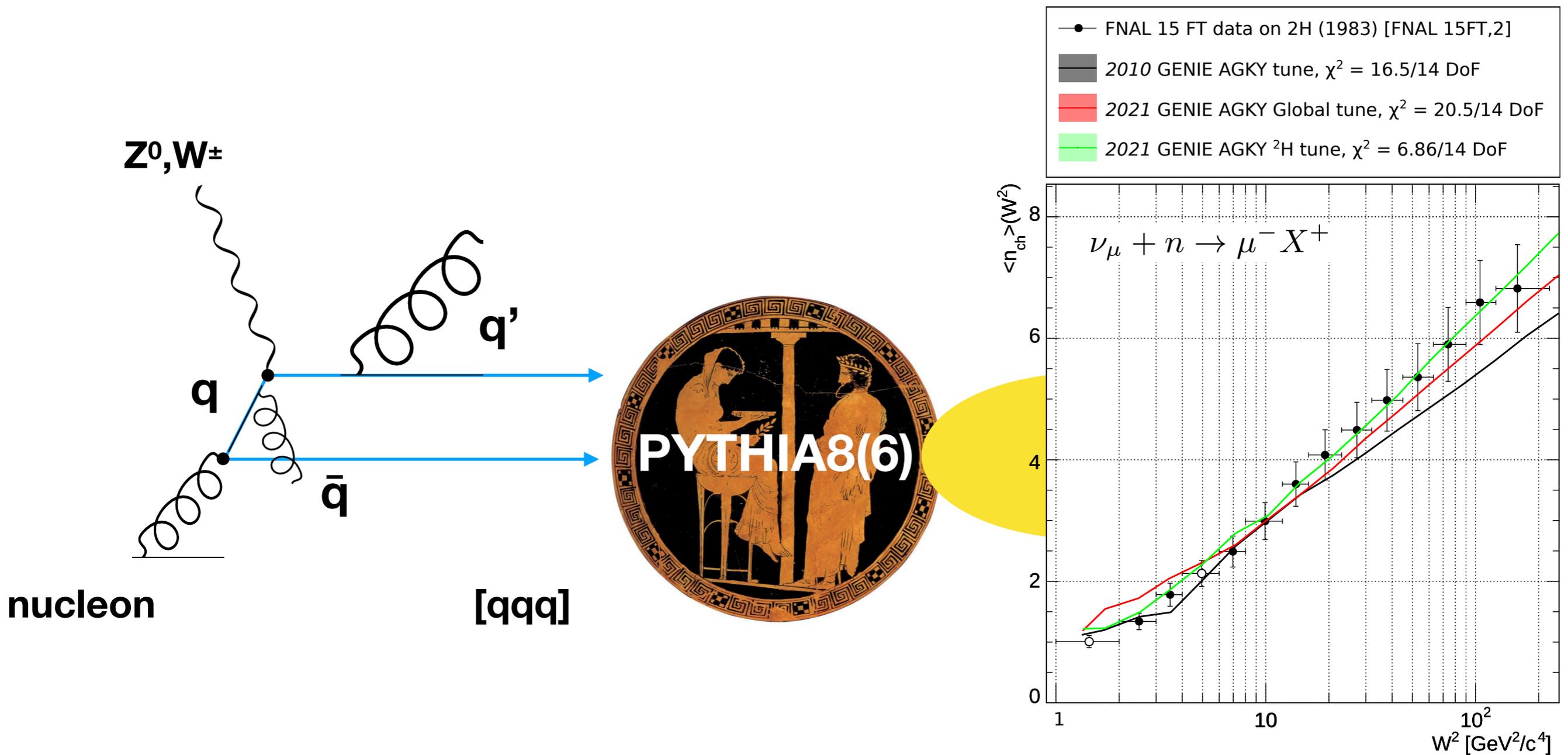
- FASERnu lies in a very interesting region.
 - For $Q < 1 \text{ GeV}$ pQCD fails.
 - Heavy quark production (charm) relevant at 1TeV.



	Model	Structure Function ($C_{ij} \otimes \text{PDF}$)
DIS	A. Bodek et al. (2005)	LO \otimes LO (GRV98 $Q_0^2=0.8$)
DIS-CHARM	M. Aivazis et al. (1994)	LO \otimes LO (GRV98 $Q_0^2=0.8$)
HEDIS	A. Cooper et al. (2011) V. Bertone et al. (2018) A. Garcia et al. (2020)	NLO \otimes NLO (HERAPDFNLO $Q_0^2=1$) NLO \otimes NLO (NNPDF31LHCb $Q_0^2=2.69$) NLO \otimes NLO (NNPDF31LHCb $Q_0^2=2.69$)

Hadronization

- Hit and remnant quarks (partonic level) input to PYTHIA for $W > 3\text{GeV}$.
 - Thorough camping to understand hadronization at low W .

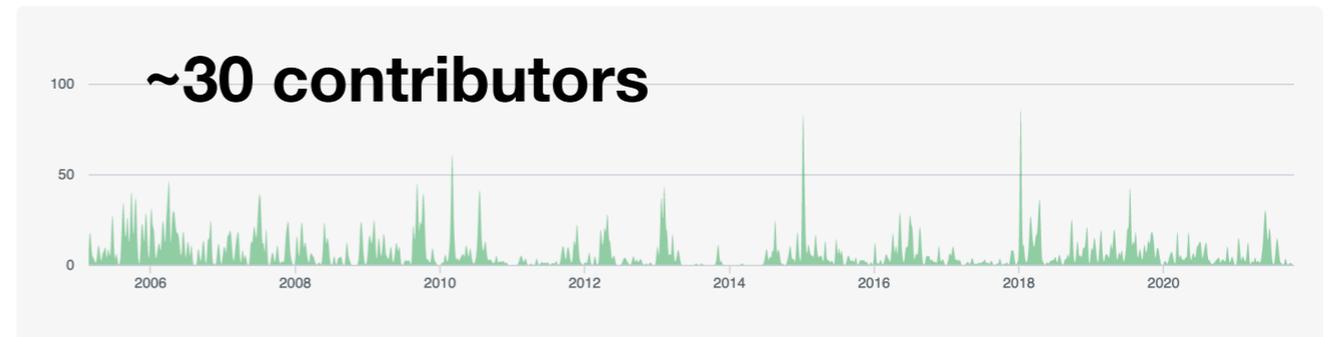


Conclusions

- GENIE provides support to several experiments with different requirements.

Webpage: <http://www.genie-mc.org>

Repository: <https://github.com/GENIE-MC>



- Different formalisms are available to explore neutrino cross sections in the TeV range.
- Several aspects are being currently study:
 - Effect of nucleon and nuclear PDFs.
 - Heavy quark contribution in the Structure Functions.
 - Parton showers using $>LO$ formalism.

Acknowledgements

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