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# Neutrino structure functions from GeV to EeV energies

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Accurate theory calculations for neutrino-nucleus scattering rates are essential in the interpretation of neutrino experiments, from oscillation measurements to astroparticle physics at neutrino telescopes. In the deep-inelastic (DIS) regime, neutrino structure functions can be reliably evaluated in the framework of perturbative QCD (pQCD). However, large uncertainties affect these structure functions at low momentum transfer, $Q \leq 2$ GeV, distorting event rate predictions for energies up to $E_\nu \sim 1$ TeV. We present a determination of the neutrino inelastic structure functions valid for all values of $Q^2$, from the resonance region to ultra-high energies. Our approach combines a data-driven machine learning parametrisation of neutrino structure functions at low and moderate $Q^2$ values matched to perturbative QCD calculations at large $Q^2$. We compare our results to other calculations in the literature, in particular with BGR18 and the Bodek-Yang model, and outline the implications for neutrino scattering experiments at the LHC such as Faser$\nu$ and the Forward Physics Facility.

## Submitted on behalf of a Collaboration?

No

## Participate in poster competition?

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