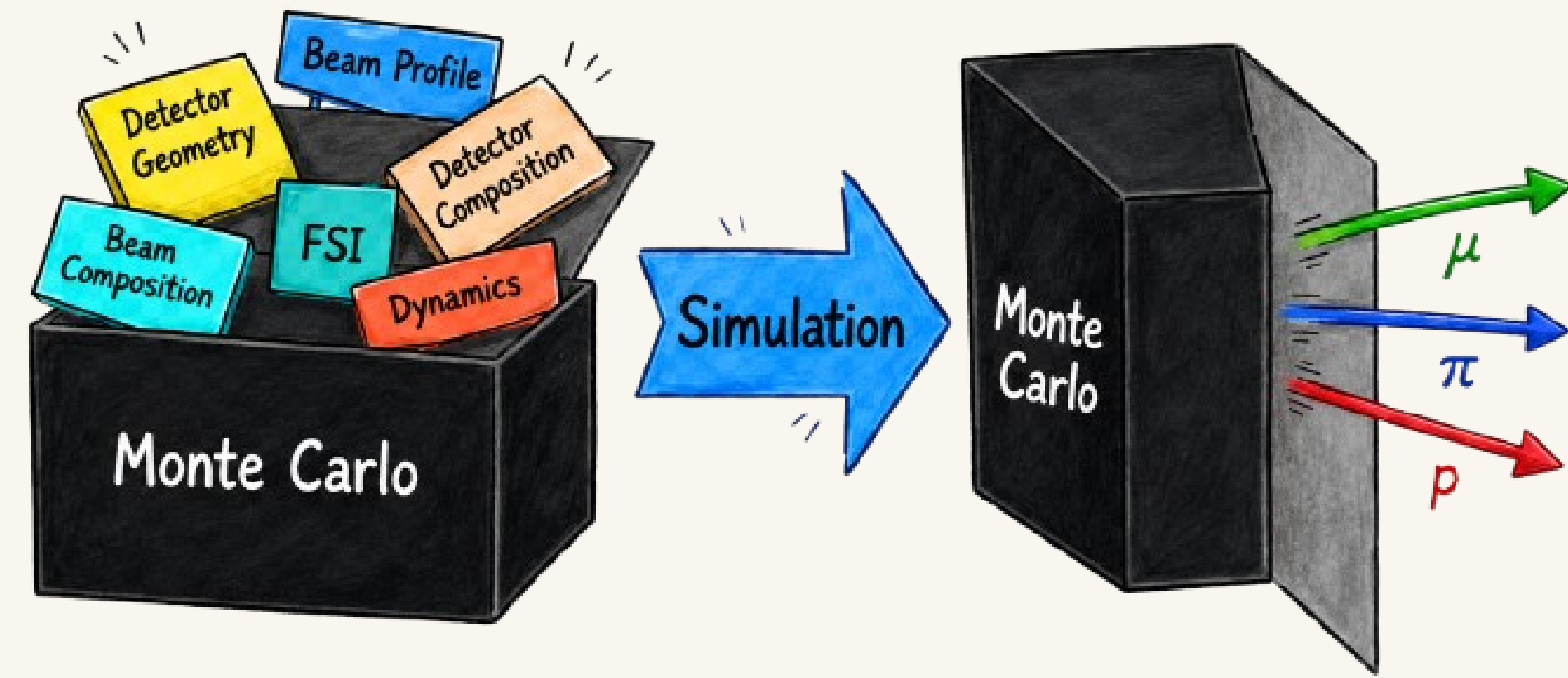




Recent Advances In NuWro 25.11 Quasielastic Channel

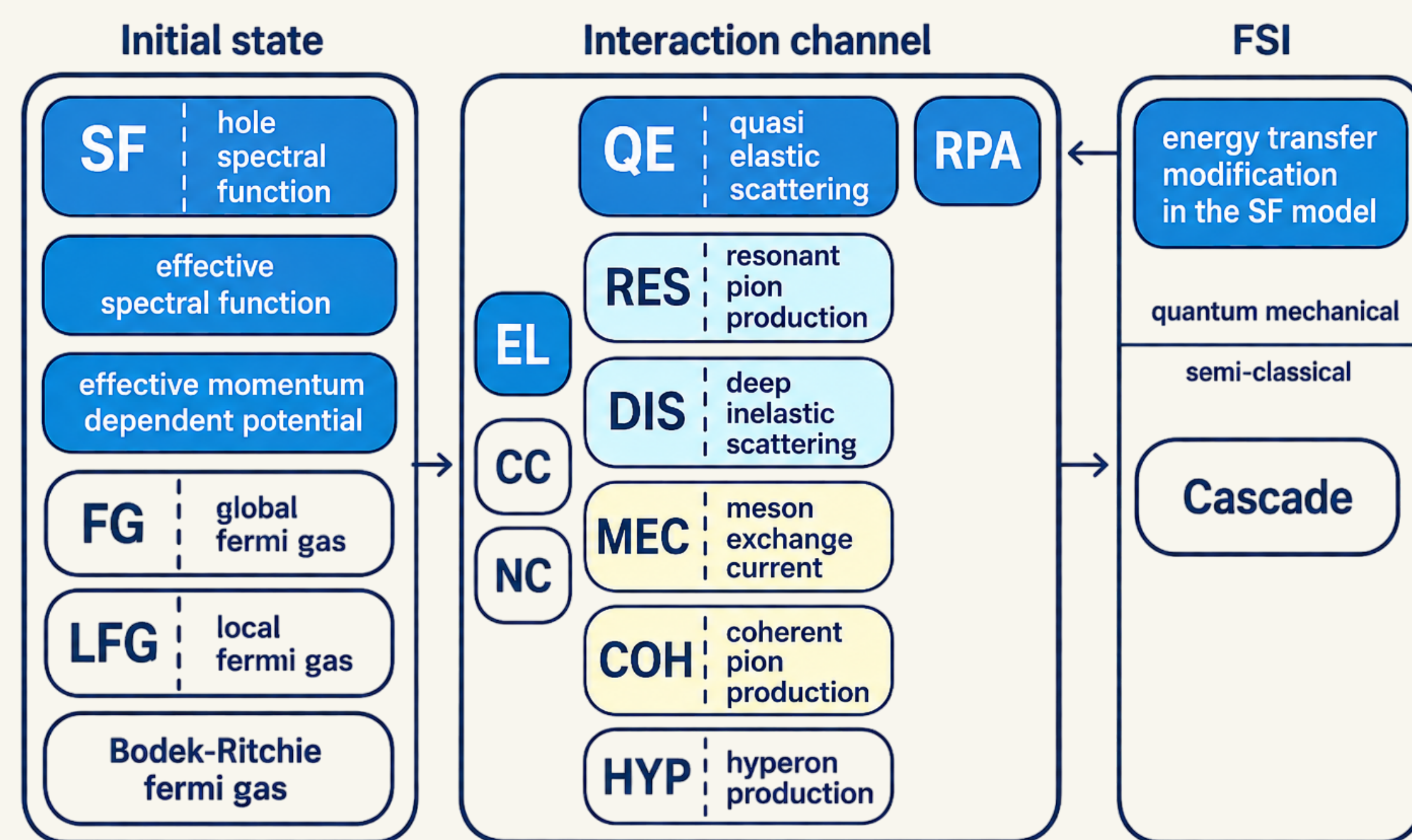
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NuWro is a Monte Carlo event generator for neutrino–nucleus interactions in the few-GeV energy region. It combines models of the primary interaction, nuclear structure, and final-state propagation to predict experimentally observable particle configurations.

NuWro blueprint



What's New in NuWro 25.11?

- ▶ Argon SF from JLab, new Carbon SF.
- ▶ MINERνA and LQCD form factors.
- ▶ Improved SRC for Argon.
- ▶ Coulomb correction, nuclear recoil, consistent inclusive and exclusive picture for FSI in QE channel for all targets.
- ▶ New RES model based on Ghent hybrid model.
- ▶ New MEC model based on Valencia model.

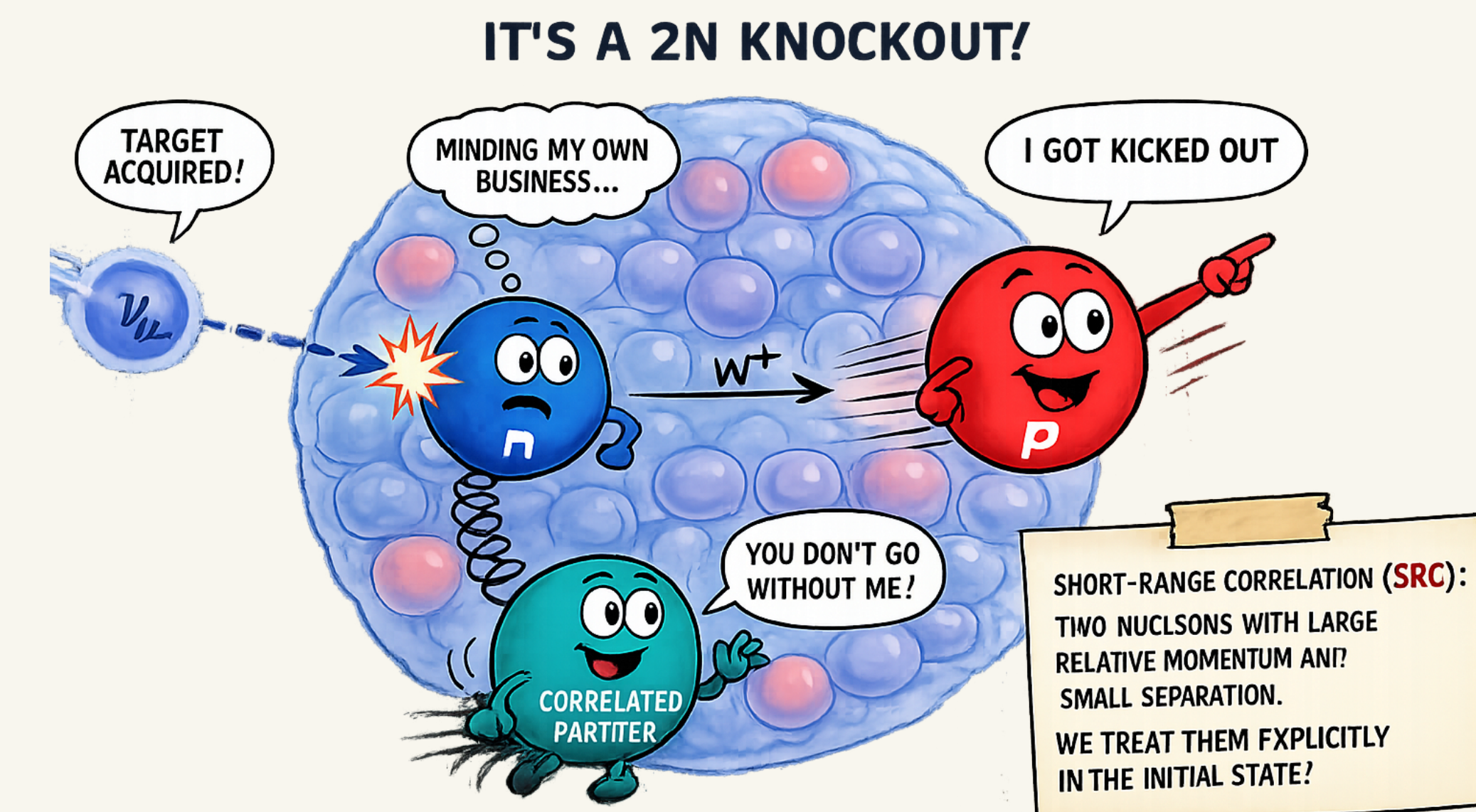


NuWro on GitHub

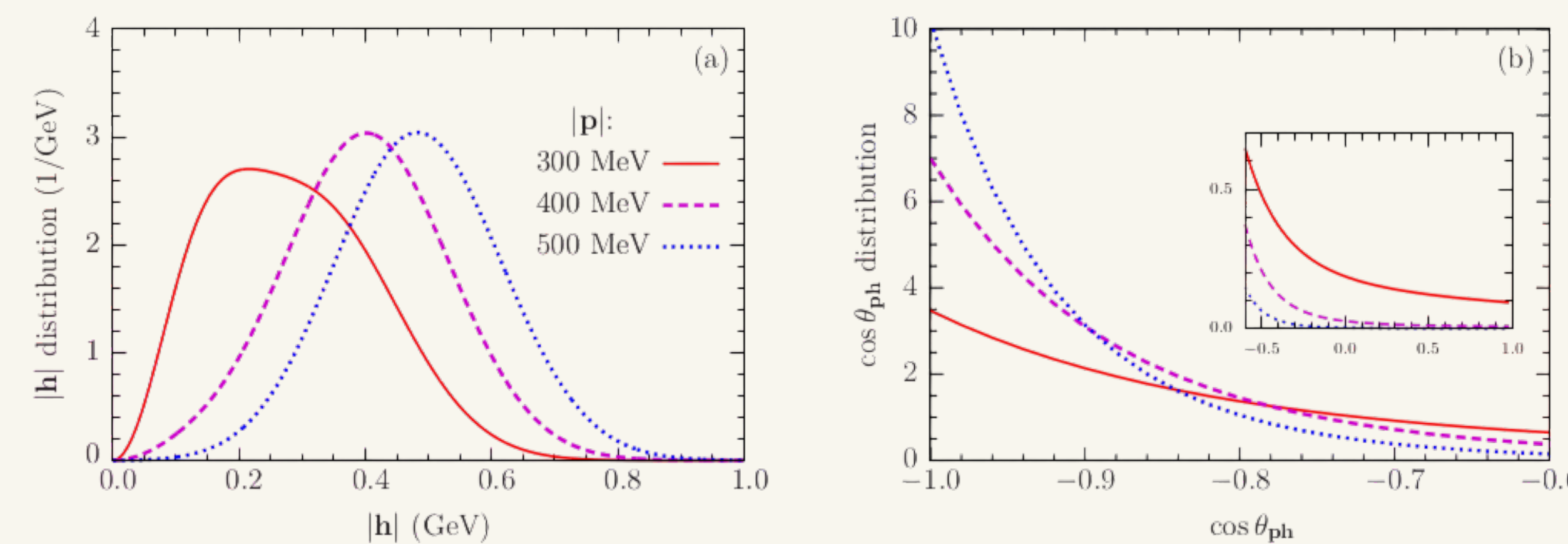
References and Acknowledgments

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2. A. Ankowski *et al.*, "Spectral function approach in NuWro: modeling of multinucleon final states in quasielastic scattering," *arXiv hep-ph* **2508.10101**.
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- ▶ Separate tables for mean-field and correlated SF of Argon
- ▶ When struck nucleon belongs to CORR contribution, a 2nd nucleon is associated at vertex.
- ▶ Not *ad hoc* and mechanically back-to-back emitted pair.
- ▶ Motion of the residual nucleus also taken into account.

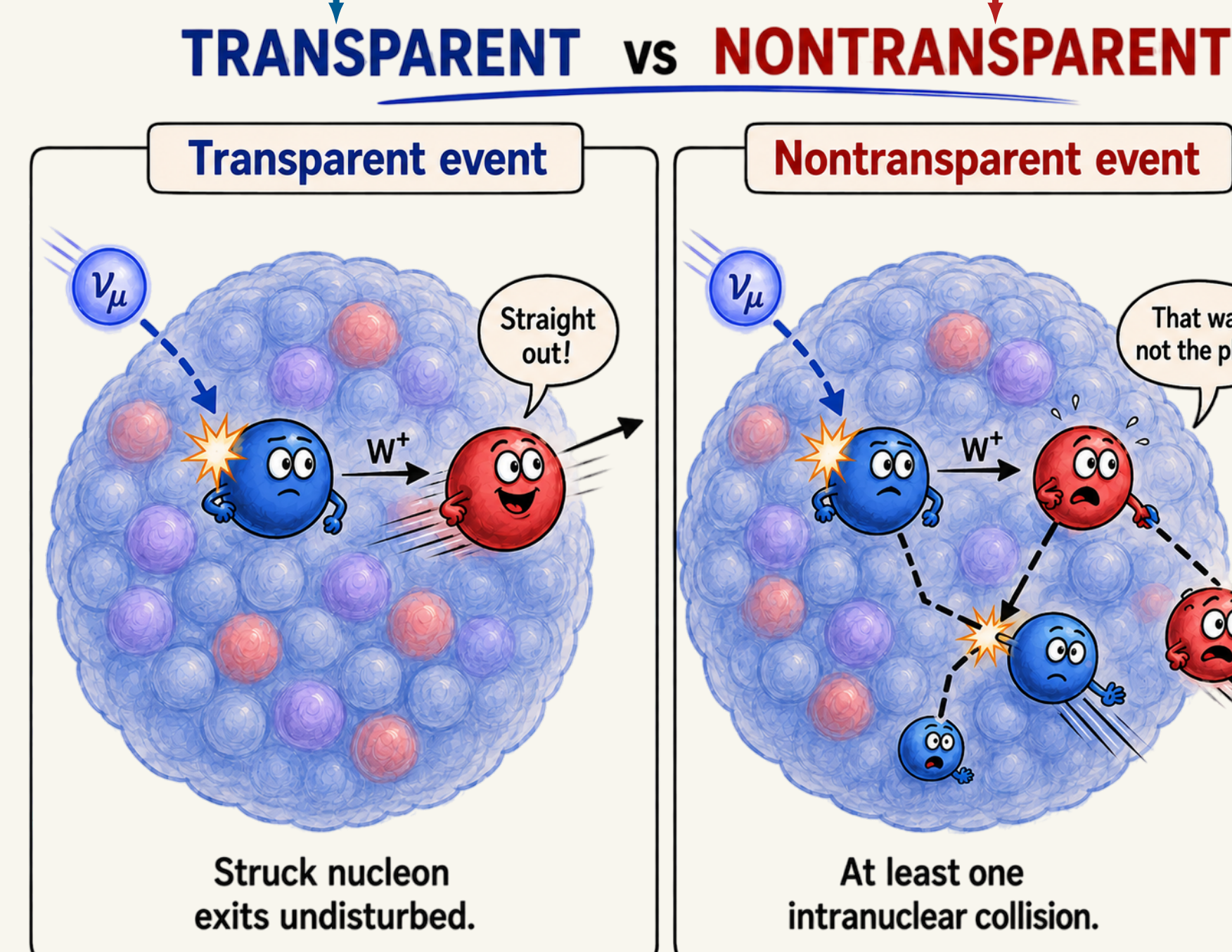


FSI in QE channel is consistently applied to bridge inclusive convolution scheme and exclusive intranuclear cascade for all targets.

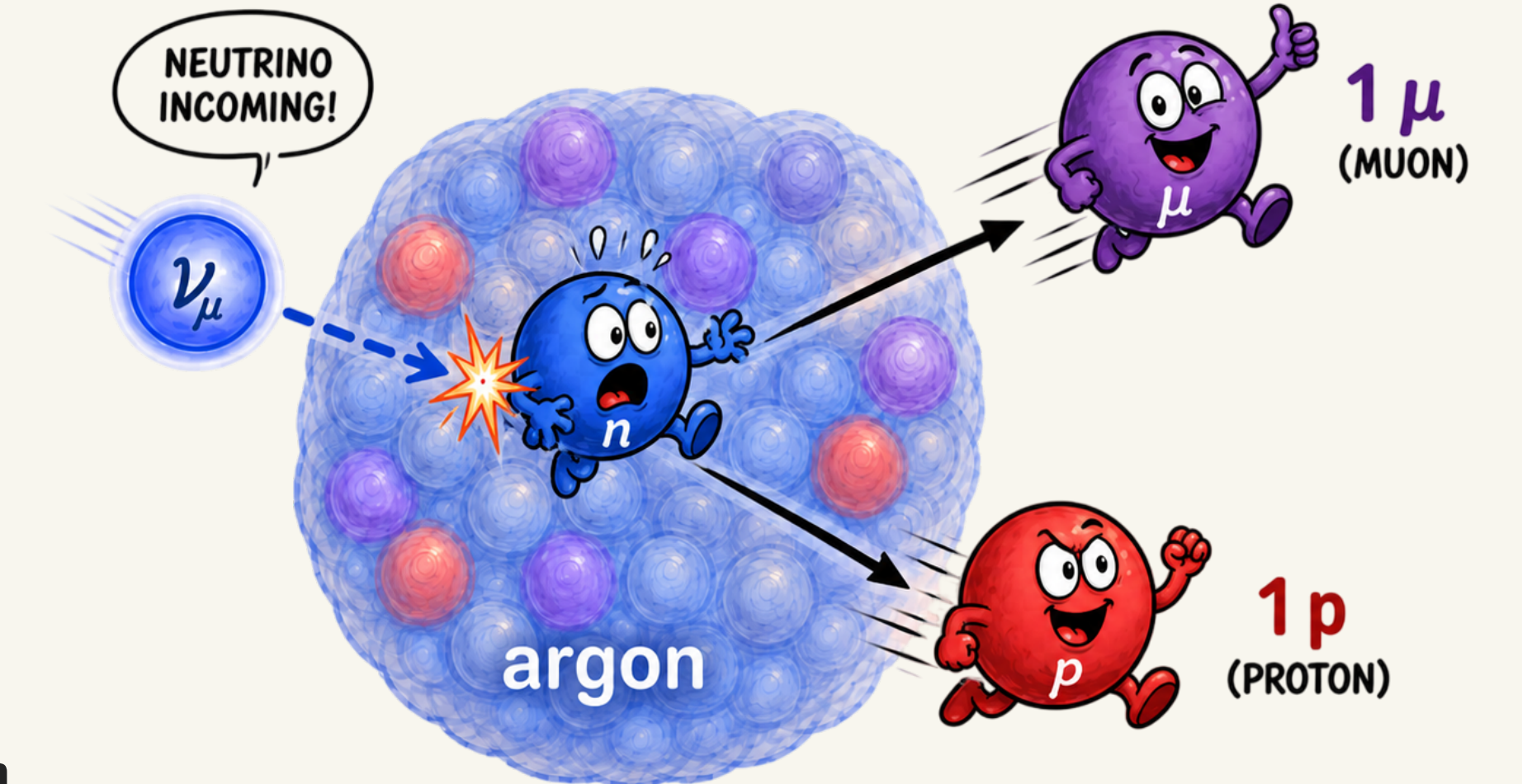
$$\frac{d\sigma^{\text{FSI}}}{d\omega d\Omega} = \int d\omega' f_q(\omega - \omega') \frac{d\sigma^{\text{PWIA}}}{d\omega' d\Omega}$$

Plane wave impulse approximation cross-section is folded with (T_A is nuclear transparency),

$$f_q(\omega) = \delta(\omega) \sqrt{T_A} + (1 - \sqrt{T_A}) F_q(\omega)$$

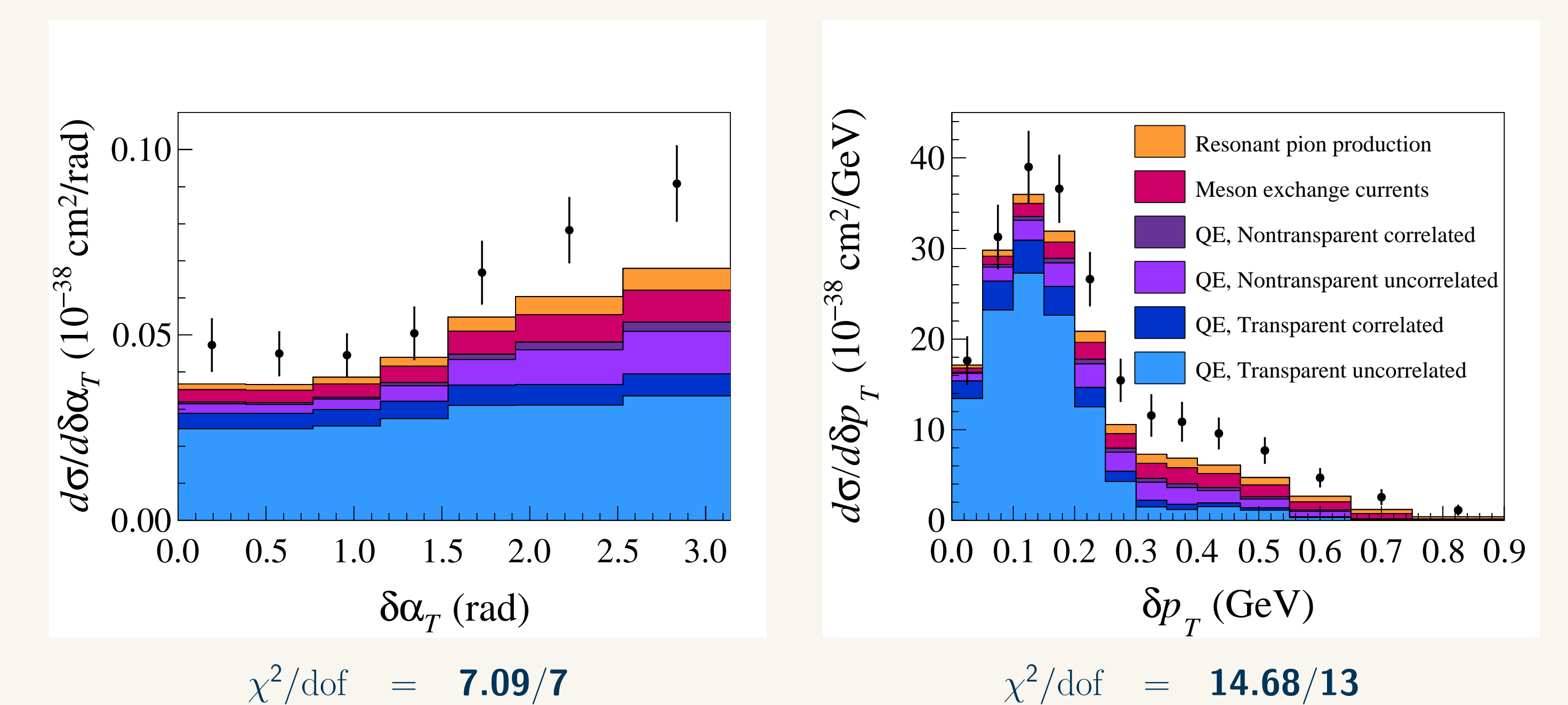


MicroBooNE CC1p0π Data



Signal definition

- ▶ One final-state muon with momentum
 $0.1 < p_{\mu^-} < 1.2 \text{ GeV}/c$,
- ▶ Exactly one signal proton with momentum
 $0.3 < p_p < 1.0 \text{ GeV}/c$,
- ▶ No neutral pions. Additional protons outside the selected momentum range, neutrons at any momentum, and charged pions with momentum below 70 MeV/c are allowed in the final state.



Electron–Carbon Scattering Data

