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NNLO single-top-quark production and decay: Discrepancies resolved, PDFs challenged[1] ZACK SULLIVAN, Illinois Institute of Technology, JOHN CAMPBELL, Fermi National Accelerator Laboratory, TOBIAS NEUMANN, Brookhaven National Laboratory — We present our recent NNLO calculation of t-channel single-top-quark production and decay that resolves a disagreement between two previous calculations whose size at the inclusive level was comparable to the NNLO correction itself, and was even larger differentially. Moving beyond those comparisons, we have included b-quark tagging to allow for comparison with experiment, and added the ability to use double deep inelastic scattering (DDIS) scales ($\mu^2 = Q^2$ for the light-quark line and $\mu^2 = Q^2 + m_t^2$ for the heavy-quark line) that allow for direct testing of parton distribution function (PDF) stability. All code will be made publicly available in MCFM. We demonstrate that several characteristic fiducial and differential standard model observables, and observables sensitive to new physics, are stable between NLO and NNLO, but point out there is a sizable difference in the prediction of some exclusive t+n-jet cross sections. Finally, we use this calculation to present preliminary results which indicate that some commonly used PDF sets are in significant disagreement, both with each other and with themselves between perturbative orders when evaluated at Tevatron energies.

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Zack Sullivan
Illinois Institute of Technology

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