

## High Energy Physics - Experiment

# First Measurement of the Muon Neutrino Charged Current Quasielastic Double Differential Cross Section

MiniBooNE Collaboration: [A. A. Aguilar-Arevalo](#), [C. E. Anderson](#), [A. O. Bazarko](#), [S. J. Brice](#), [B. C. Brown](#), [L. Bugel](#), [J. Cao](#), [L. Coney](#), [J. M. Conrad](#), [D. C. Cox](#), [A. Curioni](#), [Z. Djurcic](#), [D. A. Finley](#), [B. T. Fleming](#), [R. Ford](#), [F. G. Garcia](#), [G. T. Garvey](#), [J. Grange](#), [C. Green](#), [J. A. Green](#), [T. L. Hart](#), [E. Hawker](#), [R. Imlay](#), [R. A. Johnson](#), [G. Karagiorgi](#), [P. Kasper](#), [T. Katori](#), [T. Kobilarcik](#), [I. Kourbanis](#), [S. Koutsoliotas](#), [E. M. Laird](#), [S. K. Linden](#), [J. M. Link](#), [Y. Liu](#), [Y. Liu](#), [W. C. Louis](#), [K. B. M. Mahn](#), [W. Marsh](#), [C. Mauger](#), [V. T. McGary](#), [G. McGregor](#), [W. Metcalf](#), [P. D. Meyers](#), [F. Mills](#), [G. B. Mills](#), [J. Monroe](#), [C. D. Moore](#), [J. Mousseau](#), [R. H. Nelson](#), [P. Nienaber](#), [J. A. Nowak](#), [B. Osmanov](#), [S. Ouedraogo](#), [R. B. Patterson](#), [Z. Pavlovic](#), [D. Perevalov](#), [C. C. Polly](#), [E. Prebys](#), [J. L. Raaf](#), [H. Ray](#), [B. P. Roe](#), [A. D. Russell](#), et al. (23 additional authors not shown) You must enabled JavaScript to view entire author list.

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A high-statistics sample of charged-current muon neutrino scattering events collected with the MiniBooNE experiment is analyzed to extract the first measurement of the double differential cross section ( $\frac{d^2}{d\Omega_{\mu} d\cos\theta_{\mu}}$ ) for charged-current quasielastic (CCQE) scattering on carbon. This result features minimal model dependence and provides the most complete information on this process to date. With the assumption of CCQE scattering, the absolute cross section as a function of neutrino energy ( $\sigma[E_{\nu}]$ ) and the single differential cross section ( $\frac{d\sigma}{dQ^2}$ ) are extracted to facilitate comparison with previous measurements. These quantities may be used to characterize an effective axial-vector form factor of the nucleon and to improve the modeling of low-energy neutrino interactions on nuclear targets. The results are relevant for experiments searching for neutrino oscillations.

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