

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Spectral Methods in the Presence of Discontinuities JONAH MILLER, Los Alamos National Laboratory, PIOTROWSKA JOANNA, Institute of Astronomy, University of Cambridge, ERIK SCHNETTER, Perimeter Institute for Theoretical Physics — Spectral methods provide an elegant and efficient way of numerically solving differential equations of all kinds. For smooth problems, truncation error for spectral methods vanishes exponentially in the infinity norm and L_2 -norm. However, for non-smooth problems, convergence is significantly worse—the L_2 -norm of the error for a discontinuous problem will converge at a sub-linear rate and the infinity norm will not converge at all. We explore and improve upon a post-processing technique—optimally convergent mollifiers—to recover exponential convergence from a poorly-converging spectral reconstruction of non-smooth data.

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Date submitted: 11 Jan 2018

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