Forrest Wolfgang Glines

Contact Information

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Summary

I am a sixth year doctoral student at Michigan State University, pursuing a dual PhD in Astrophysics and Computational Mathematics, Science and Engineering, and seeking post doctoral positions starting Summer 2022. My research focuses on astrophysics simulations of magnetic fields in galaxy clusters, feedback from active galactic nuclei in the intracluster medium, computational magnetohydrodynamics and relativistic hydrodynamics methods, and performance-portable multi-physics simulations of astrophysicsal cosmological, and terrestrial plasmas using high performance computing resources.

Education

Michigan State University, Astronomy   **August 2016 - *Present***

East Lansing, Michigan

Dual PhD in Astrophysics and Computational Mathematics, Science and Engineering

Brigham Young University, B.S. (magna cum laude)   **April 2016**

Provo, Utah

Dual Major in Physics and Mathematics with emphasis in Applied and Computational Mathematics

Computer Science Minor

Experience

Graduate Research Assistant   **August 2016 - Present**

MSU Department of Physics and Astronomy

Developing and running multiphysics simulations of galaxy clusters with thermal and magnetic feedback from active galactic nuclei

Developing performance-portable astrophysics codes for exascale GPU and CPU supercomputers

Investigating the development of magnetized turbulence in astrophysical plasmas

Graduate Student Researcher   **December 2018 - Present**

Sandia National Laboratory

Developing robust relativistic hydrodynamics methods and IMEX methods for relativistic two-fluid electrodynamics

Teaching Assistant   **Spring 2018, Fall 2018**

MSU Department of Physics and Astronomy

Taught introduction to astronomy for non-science majors for Spring 2018

Assisted with a graduate course on parallel computing

Undergraduate Student Researcher   **May - August 2015, 2016**

Los Alamos National Laboratory

Developed a ray tracing radiative transfer package for a cosmology code with meshless hydrodynamics

Research Assistant   **December 2013 - April 2016**

BYU Department of Physics and Astronomy

Developed a relativistic magnetohydrodynamics code for GPUs using CUDA

Project Assistant   **November 2013 - April 2016**

BYU Department of Mathematics

Edited a textbook on mathematical foundations for numerical methods

Helped write lab manuals on numerical methods using Python

Publications

      Glines, F.W., Grete, P., O'Shea, B.W. "Magnetized decaying turbulence in the weakly compressible Taylor-Green vortex," 2021, Phys. Rev. E 103, 043203.

      Grete, P., Glines, F.W., and O'Shea, B.W. "K-Athena: A Performance Portable Structured Grid Finite Volume Magnetohydrodynamics Code," 2021 IEEE Transactions on Parallel and Distributed Systems 32, 85–97.

      Glines, F.W., O'Shea, B.W., and Voit, G.M. "Tests of AGN Feedback Kernels in Simulated Galaxy Clusters," 2020, The Astrophysical Journal 901, 117.

      Glines, F.W., Anderson, M., and Neilsen, D. "Scalable Relativistic High-Resolution Shock-Capturing for Heterogeneous Computing," 2015, IEEE International Conference on Cluster Computing, pp. 611–618.