



Modular Unified Solver of the Equation of State

Nicolas Yunes (PI), Jacquelyn Noronha-Hostler (co-PI), Jorge Noronha (co-PI), Veronica Dexheimer (co-PI), Claudia Ratti (co-PI), **T. Andrew Manning** (Sr. Investigator)

Purpose // Create **open cyberinfrastructure** and advanced algorithms that provide researchers the tools they need to study the entire QCD phase diagram in order to **answer fundamental physics questions** about matter at extreme temperatures and pressures.

Collaboration // We are an expanding, multi-institution, **international collaboration of physicists and computer scientists**, including UIUC, University of Houston, Kent state and many others.

Modular calculation engine // Code modules developed by independent research groups to **calculate equations of state** and **derive physical observables** are integrated into a calculation engine at the core of the MUSES cyberinfrastructure.

Sustainability // The entire MUSES software stack is portable, reproducible, and free and open source. We are building an **open source community** using **self-hosted and decentralized software solutions** where possible, including an online forum powered by Discourse, chat & teleconferencing powered by Matrix, and more, all secured by an identity and access management system based on Keycloak and CILogon.



Learn more at
<https://musesframework.io>

This award #2103680 by the NSF Office of Advanced Cyberinfrastructure is jointly supported by the Windows on the Universe NSF Big Idea program, the Physics at the Information Frontier (PIF) program in the Division of Physics (PHY), and the Division of Astronomical Sciences (AST).

