## Programming Infrastructure Updates for NIMROD

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## Code improvements are driven by ambitious physics modeling goals

- A continuum kinetic implementation of the drift kinetic equations in NIMROD enables accounting for kinetic effects in macroscopic behavior.
- A full implementation of blocks of unstructured elements would allow boundaries to conform to complex shapes.
- In order to study stellarators and account for detailed limiter geometry in tokamaks, NIMROD will require more flexible mesh representations.
- We are interested in experimenting with a variety of finite element formulations to develop more robust solvers for extended MHD.

I will be discuss our efforts to support implementation of these features with the abstraction capabilities of modern Fortran.

TP11.00132 : Core Infrastructure Upgrades to the NIMROD Codebase

## Additional infrastructure related to CTTS goals

- Created a repository on GitLab that provides helpful development tools
  - Issue board for tracking bugs and feature requests
  - Fully integrated automated testing system including docker container images
  - Merge requests to review changes before they are incorporated into primary branches
- Started writing unit tests
- Plans to include timing and memory trace tooling