

# THE NEED FOR OPEN SOURCE CODES

- Most codes developed by small teams needing timely science return: keeps work efficiently focused tangible results
- Few groups have the expertise to do everything: almost all development is incremental and relies on open codes to build atop
- Strong incentives for individual researchers to keep codes to themselves — but this would stunt the field as a whole

# CHALLENGES

- Openness & modularity is an active choice that must be made repeatedly
- Community must recognize that a closed-source code is a non-replicable result
- The vision of groups who developed modular frameworks, together with the shifting of funding agency requirements towards open-sourcing have been crucial
- Finding ways to reward the development of useful software is critical to incentivize researchers design codes well so that they are modular and usable