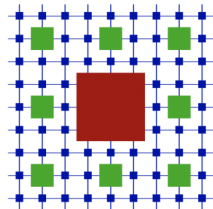


CarpetX - a new mesh refinement driver for the Einstein Toolkit

Erik Schnetter (PI), Roland Haas (UIUC), Samuel Cupp (LSU), Steven R. Brandt (LSU), Philipp Moesta (Amsterdam), many others

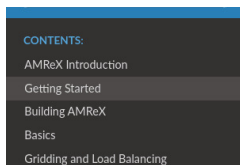
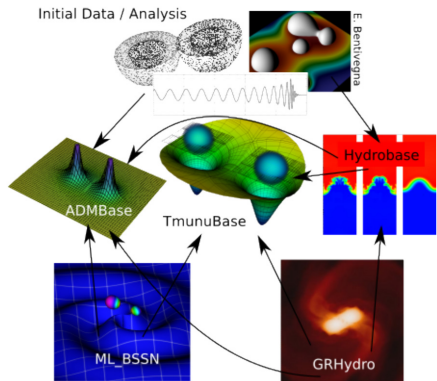


- Designed for the Einstein Toolkit

- Uses AMReX for Exascale scalability

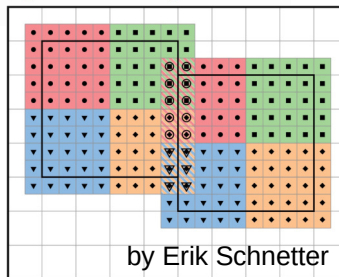
- Multiple groups joining hydro code development: RIT, Milan, PI

– Funded by DOE ECP project



Welcome to AMReX's documentation

AMReX is a software framework containing all the functionality to write massively parallel, block-structured adaptive mesh refinement (AMR) applications. AMReX is freely available on Github.



by Erik Schnetter

– Much improved multi-threading using tiles

– Built in CUDA support

Improved conservative to primitive and equation of state handling based on RePrimAnd framework (AEI)

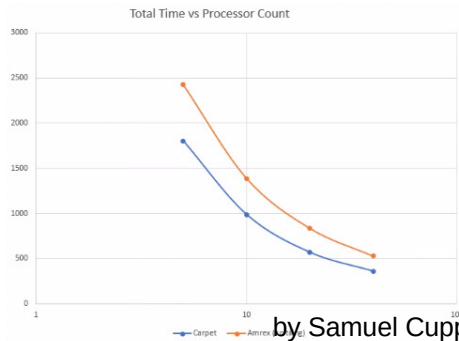
– provable convergence

– robust error reporting

– tabulated hot and cold EOS

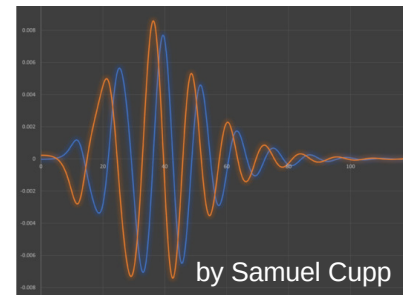
- Improved I/O (ADIOS2, openPMD)

- Improved SIMD vectorization



by Samuel Cupp

- QC0 BBH merger simulation
- Extract ψ_4 waveforms



by Samuel Cupp

<https://bitbucket.org/eschnett/cactusamrex>



This material is based upon work supported by the National Science Foundation under Grant No. 2004879

• True adaptive mesh refinement based on local error estimate

• High-order prolongation / restriction operators

• Vertex / cell / face variables

– Refluxing for exact mass conservation

• Data validity checking at runtime built in from the start

