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Department of Computer Science

Using code or ideas

Do we need more code re-use or do we need reusable code fragments?

T. Weinzierl

November 8, 2022

Three codes(*) that I'm proud of

(* and papers)

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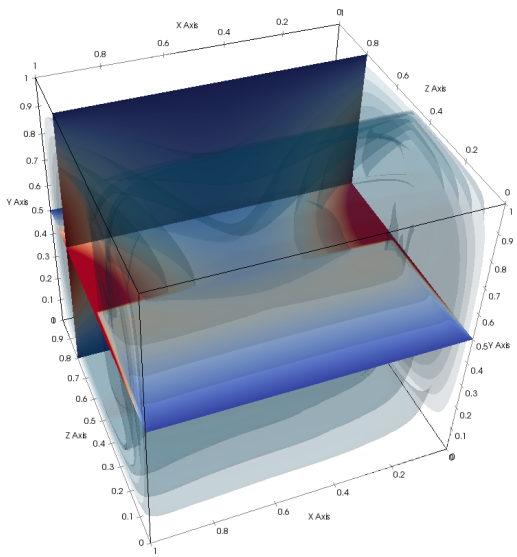

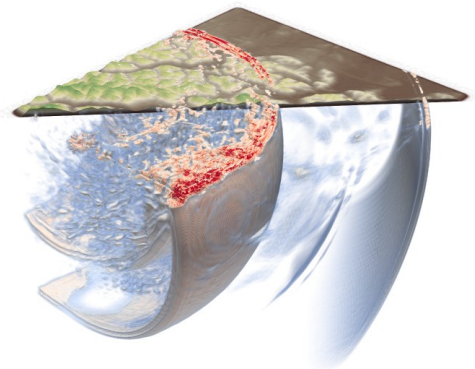
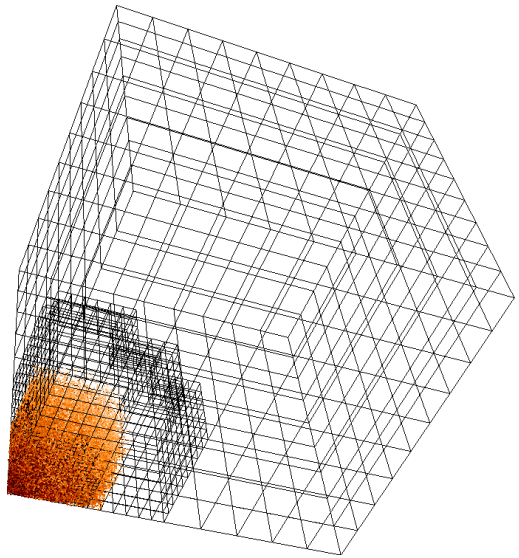

Left to right:

- Quasi matrix-free multigrid
- ADER-DG on AMR with tasking
- PiC with tunneling particles

Code reuse

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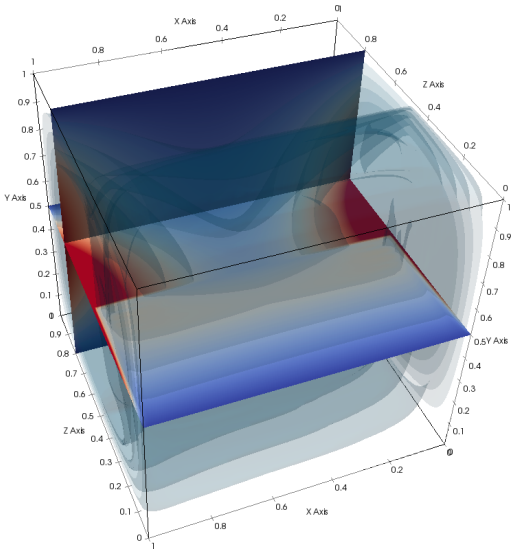

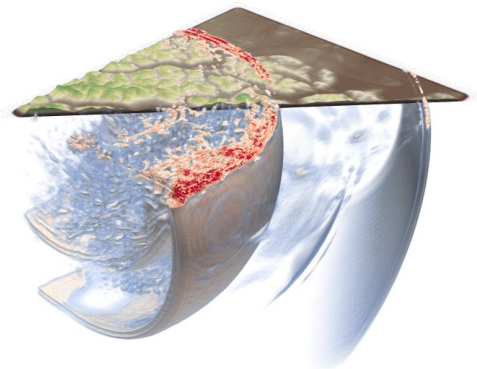
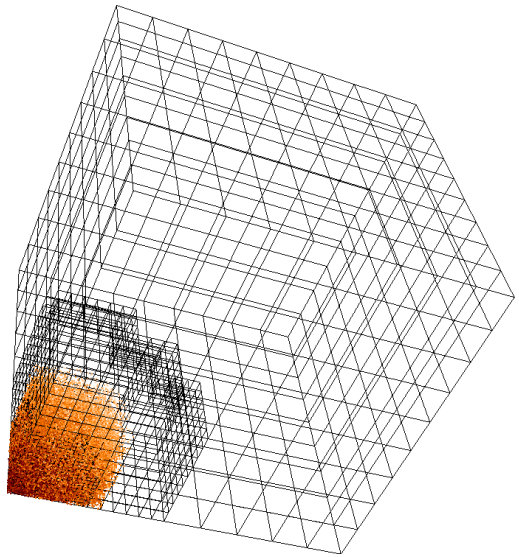

Left to right:

- Quasi matrix-free multigrid: My PhD students and PostDocs
  (they have to)
- ADER-DG on AMR with tasking: Only collaborators
  (they have to)
- PiC with tunneling particles: No

Ideas however have been reused

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- Pseudo code
  - Integrate concepts into their software landscape
  - Use their language and programming style of choice
- Correctness proofs
  - Confident that re-implementation works
  - Define test cases (or assertions)
- Code snippets
  (we have reused SPH kernels by SWIFT, e.g.)
  - Few assumptions on frameworks or toolboxes
  - Well-documented

Take away

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Re-usable code:

- Less code, more algorithms
- More formal methods on implementation side
- More toolboxes, fewer libraries and frameworks

Controversial statements:

- Open source $\neq$ reusable or reproducible science
- Frameworks are obstacle to re-usage
- "As applied mathematician you have to proof something" $\Rightarrow$ but not the wrong thing
- Few assumptions on frameworks or toolboxes