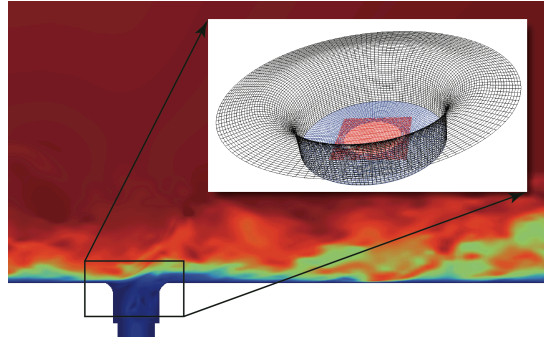


Illinois DEEP DIVE

Overset Meshes: Implementation, Use, and Vectorization

XPACC: The Center for Exascale Simulation of Plasma-coupled Combustion
University of Illinois at Urbana-Champaign

Locally structured, overset meshes, as used in the Center's principal code *PlasComCM*, provide a useful compromise between meshing flexibility and stencil-based efficiency. They also offer logical simulation units for high-order/high-resolution discretizations, decomposing data in memory, representing disparate physics, and transformations to realize performance. This *Deep Dive* will provide a detailed look at our overset mesh implementation in *codelet-OM*, a model for *PlasComCM*. Participants will examine the code structure, construct their own meshes, run it on a platform of interest, or analyze it with tools designed to facilitate performance at scale. The same *codelet-OM* will be analyzed by *VectorSeeker*, an XPACC vectorization analysis tool used within the Center. Tasks will be designed to facilitate the hands-on experience of the participants. Center code docents will provide support and guidance.



Wednesday, March 4

- 8:30** **Introductions**
- 9:00** **XPACC Overview** (Freund)
- 9:30** **Overset meshes and our implementation** (Bodony)
- 10:30** **Hands on:** Dive into *codelet-OM* (Bodony and code docents)
- obtaining, building, running, verifying, *etc.*
- Noon** **Lunch:** Discussion of progress and questions
- 1:00** **VectorSeeker:** a vectorization analysis tool (Evans/Pauda)
- 1:30** **Hands on:** Diving Deeper with more detailed tasks, *e.g.:*
- Interpolation stencils, numerical properties, *etc.*
 - Make meshes and run
 - Overset mesh tools
 - Analyzing *codelet-OM* with *VectorSeeker*
 - *etc.*
- 4:00** **Regroup and cross-pollinate:** 2-minute synopsis by each participant
- 6:00** **Dinner:** Self organize, suggested restaurants

Thursday, March 5

- 8:30** **Hands on:** Deepest Diving based on participant interests
- other and/or more advanced tasks, discussions with center personnel
- 11:00** **Summary:** 2-minute synopsis and observations by each participant
- Noon** **Lunch** and follow-on discussion