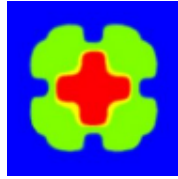
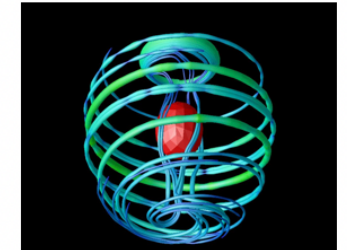
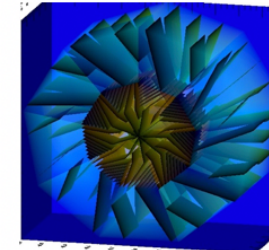
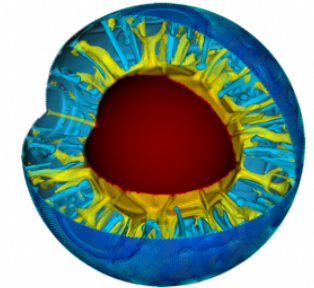
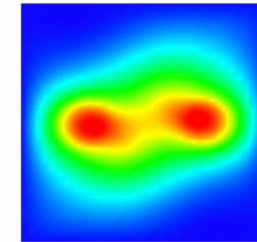
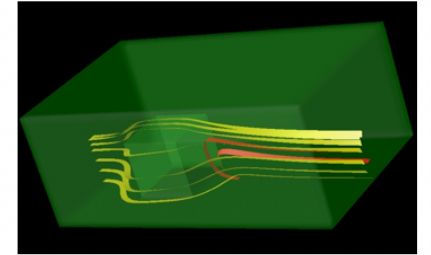
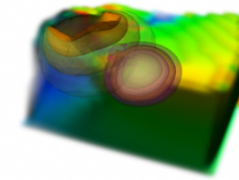


deal.II



deal.II — an open source finite element library. Modern interface to the complex data structures and algorithms required for solving partial differential equations computationally using state-of-the-art programming techniques.

- **Meshes and elements:**
 - Supports h- and p-adaptive meshes in 1d, 2d, and 3d
 - Easy ways to adapt meshes: Standard refinement indicators already built in
 - Many standard finite element types (continuous, discontinuous, mixed, Raviart-Thomas, Nedelec, ABF, BDM,...)
 - Full support for coupled, multi-component, multi-physics problems
- **Linear algebra:**
 - Has its own sub-library for dense and sparse linear algebra
 - Interfaces to PETSc, Trilinos, UMFPACK, ScaLAPACK, ARPACK
- **Pre- and postprocessing:**
 - Can read most mesh formats
 - Can write almost any visualization file format
- **Parallelization:**
 - Uses threads and tasks on shared-memory machines
 - Uses up to 100,000s of MPI processes for distributed-memory machines
 - Can use CUDA
- **Open-source software:**
 - Used for a wide range of applications, including heart muscle fibers, microfluidics, oil reservoir flow, fuel cells, aerodynamics, quantum mechanics, neutron transport, numerical methods research, fracture mechanics, damage models, sedimentation, biomechanics, root growth of plants, solidification of alloys, glacier mechanics, and many others.
 - Freely available on GitHub



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