

Moltres: finite element based simulation of molten salt reactors

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Summary

Moltres (Lindsay and Huff 2016) is a physics application for multiphysics modeling of fluid-fuelled molten salt reactors (MSRs). It couples equations for neutron diffusion, thermal hydraulics, and delayed neutron precursor transport. Neutron diffusion and precursor transport equations are set-up using an action system that allows the user to use an arbitrary number of neutron energy and precursor groups respectively with minimal input changes. Moltres sits on top of the Multi-physics Object-Oriented Simulation Environment (Gaston et al., n.d.) which gives it the capability to run seamlessly in massively parallel environments. To date Moltres has been used to simulate MSRs in 2D-axisymmetric and 3D geometric configurations.

References

Gaston, Derek R., Cody J. Permann, John W. Peterson, Andrew E. Slaughter, David Andrš, Yaqi Wang, Michael P. Short, et al. n.d. “MOOSE: Multiphysics Object Oriented Simulation Environment.” <https://github.com/idaholab/moose>.

Lindsay, Alexander, and Kathryn Huff. 2016. “Moltres: Open Source Simulation of Molten Salt Reactors.” doi:10.5281/zenodo.801822.