

Abstract Submitted
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Towards an Exascale Implementation of an Adaptive Sparse Grid Discretization (ASGarD).¹ DAVID GREEN, GRAHAM LOPEZ, LIN MU, ED D'AZEVEDO, WAEL ELWASIF, Oak Ridge National Laboratory, TYLER MCDANIEL, TIMOTHY YOUNKIN, University of Tennessee, Knoxville, ADAM MCDANIEL, South Doyle High School, Knoxville, Tennessee, SEBASTIAN DE PASCUALE, DIEGO DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory — The development, implementation details, and progress of an exascale targeted continuum solver for the high-dimensional PDEs of relevance to fusion will be presented. The Adaptive Sparse Grid Discretization (ASGarD) software project combines novel methods from the applied math community with performance portable computer science efforts to enable the extreme numbers of degrees of freedom required to simulate the high dimensional PDEs in a noise free manner. We will discuss the project workflow whereby domain scientists, applied mathematicians, computer scientists, software engineers, and vendors are contributing to building an exascale enabled tool in a maintainable manner. Application of ASGarD to several standard plasma physics benchmark problems, as well as progress on specific physics use cases will also be presented.

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David Green
Oak Ridge National Laboratory

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