Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**On the accuracy of difference formulas at block interfaces in Structured Adaptive Mesh Refinement (S-AMR) methods**[1] MARCOS VANELLA, ELIAS BALARAS, The George Washington University — S-AMR is a cost/efficient strategy to solve a variety of complex problems in laminar and turbulent incompressible flows. The computational grid consists of a number of nested grid blocks at different resolution levels. The coarsest grid blocks always cover the entire computational domain, and local refinement is achieved by the bisection of selected blocks in every coordinate direction. This generates coarse-fine interfaces between blocks whose treatment affects the accuracy and conservation properties of solver. In the present study we will focus on the effects of different interpolation strategies on the properties of finite-differences taken at block boundaries or cells neighboring the boundaries. Looking into a set of model problems we found that for a variety of popular interpolation schemes (both low and high order) the symmetry properties of central difference operators are lost and dissipation and phase errors are added to the errors of the difference formulas. Recurring interpolation, in particular, degrades the quality of formulas as more coarse and fine point values are introduced in an asymmetric manner. Solution strategies based on the minimization of the modified wavenumber error will be presented.

[1]Supported by the NSF

Elias Balaras
The George Washington University

Date submitted: 05 Aug 2011 Electronic form version 1.4