Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

**A Mesh Refinement framework for the Lattice Green's Function method**[1] KE YU, BENEDIKT DORSCHNER, MARCUS LEE, TIM COLONIUS, California Institute of Technology — We report on progress in developing the lattice Greens function (LGF) technique for solving viscous, incompressible flows on unbounded domains. This method exploits the regularity of the finite-volume scheme on a formally unbounded Cartesian mesh to yield robust (conservative, stable) and computationally efficient solutions. It is spatially adaptive, but of fixed resolution. Here we develop an adaptive mesh refinement strategy compatible with the LGF algorithm. The solution to the pressure Poisson equation is approximated using the LGF technique on a composite mesh where different regions can have different resolutions. This is further combined with an integrating factor technique for the viscous term and an appropriate Runge-Kutta scheme for the resulting differential-algebraic equations. The algorithm is verified and validated with numerical simulations of vortex rings.

[1]ONR Grant No. N00014-16-1-2734

Ke Yu
California Institute of Technology

Date submitted: 03 Oct 2019 Electronic form version 1.4