Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**Fluid-Structure Interaction for Flapping Flexible Wings with Large Mass Ratio**[1] MIN XU, MINGJUN WEI, New Mexico State University — A strong-coupling approach has been successfully used in our previous study for the fluid-structure interaction of flapping flexible wings. However, when the mass ratio of wing and fluid is considered, we are facing a problem to solve Poisson equation with discontinuous coefficients. As the mass ratio increases, normal algorithm for solving the above equation becomes costly and unstable. In this work, we applied the Black Box Multigrid Conjugate Gradient Preconditioned Method (Box-MGPCG) and a smoothing function to overcome the problem. The new algorithm shows consistent efficiency for mass ratio up to 1000. Therefore, it allows us to study the effect of large mass ratio to the performance of flapping flexible wings. Simulation results are also presented here.

[1]Supported by ARL through Army High Performance Computing Research Center

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Date submitted: 05 Aug 2011 Electronic form version 1.4