Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Wake identification of stratified flows using Dynamic Mode Decomposition[1] CHAN-YE OHH, GEOFFREY SPEDDING, University of Southern California — Early experiments suggest that early wake information including body geometry and initial conditions in a linearly stratified fluid is lost during the wake evolution process (Meunier and Spedding *Phys. Fluids* 16, 298-305, 2004). Though this result was established for certain statistical quantities, it is less clear that there is no pattern remaining, and the process by which it is lost is also not established. Here we investigate how to identify, in principle, the various known regimes of stratified flow using a more sophisticated method, Dynamic Mode Decomposition (DMD), on 3D wake data from tomographic PIV and second-order DNS at low Re ($200 \leq \mathrm{Re} \leq 1000$) and low Fr ($0.5 \leq \mathrm{Fr} \leq 8$). Within the large set of modes, the dominant dynamic modes can be ranked and categorized into known regimes from a mode selection algorithm. The identification process is further refined and tested for spatially and temporally limited wake measurements.

[1]Support from ONR Grant N00014-15-1-2506 under Dr. Peter Chang is most gratefully acknowledged.

Chan-ye Ohh
University of Southern California

Date submitted: 31 Jul 2019 Electronic form version 1.4