

# GTP Visit Description: David Montgomery

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*Geophysical Turbulence Program – 2007 NAR*

*Pablo D. Mininni (NCAR), David Montgomery (Dartmouth), Annick Pouquet (NCAR) and Leaf Turner (Cornell)*

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This past year saw important efforts undertaken during the visit by Dr. David Montgomery (Dartmouth). Dr. Montgomery continued his fruitful collaboration with Turbulence Numerics Team members P. Mininni, and A. Pouquet on the subject of fluids in rotating and non-rotating spheres. This work makes use of a computational method developed in previous years to study neutral or conducting incompressible fluids inside a rigid spherical boundary, using a global spectral expansion basis (the Chandrasekhar-Kendall vector eigenfunctions of the curl operator) specifically adapted to the geometry. Progress was made in understanding how rotation affects the dynamics, particularly in the case of conducting fluids, in the context of selective decay. In addition, effects of viscosity and rotation were studied as they relate to dynamos for generating magnetic fields in turbulent rotating flows, important for understanding planetary and solar dynamos and liquid metal laboratory dynamos. (See also the associated research [catalog item](#).)

This collaboration yielded two publications this year:

## References

- [1] P.D. Mininni and D.C. Montgomery, “Magnetohydrodynamic activity inside a sphere,” *Phys. of Fluids* **18**, 116602 (2007).
- [2] P.D. Mininni, D.C. Montgomery, and L. Turner. “Hydrodynamic and magnetohydrodynamic computations inside a rotating sphere,” *New J. Phys.* **9**, 303 (2007).