

Rotating Rayleigh-Bénard convection for high Rayleigh numbers

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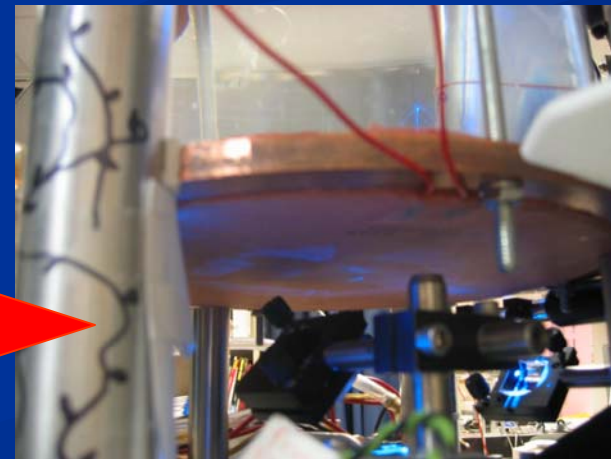
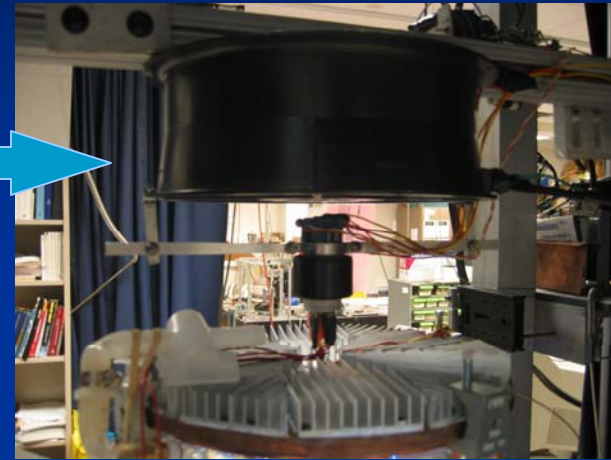
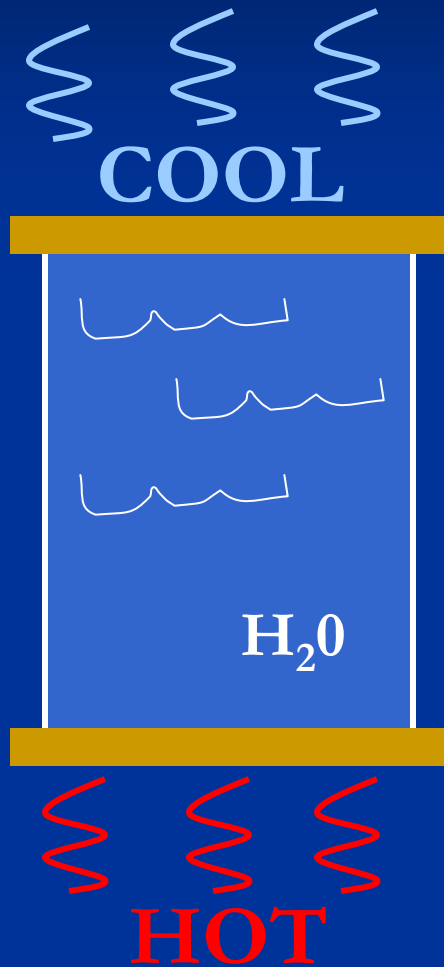
What is convection?

- Warm water molecules are less dense than cooler ones, buoyancy causes the warmer molecules to rise and cooler ones to fall
- Rayleigh-Bénard convection
- Rayleigh **Ra** number classifies the convection:

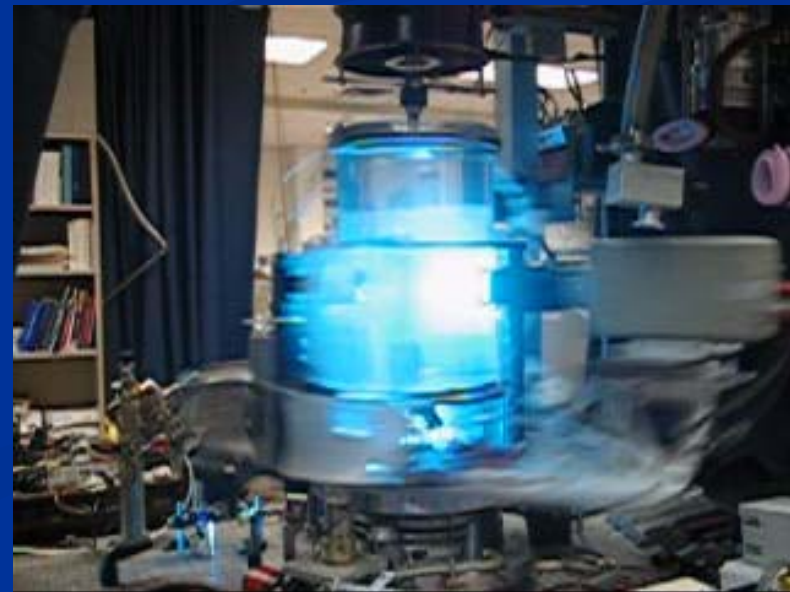
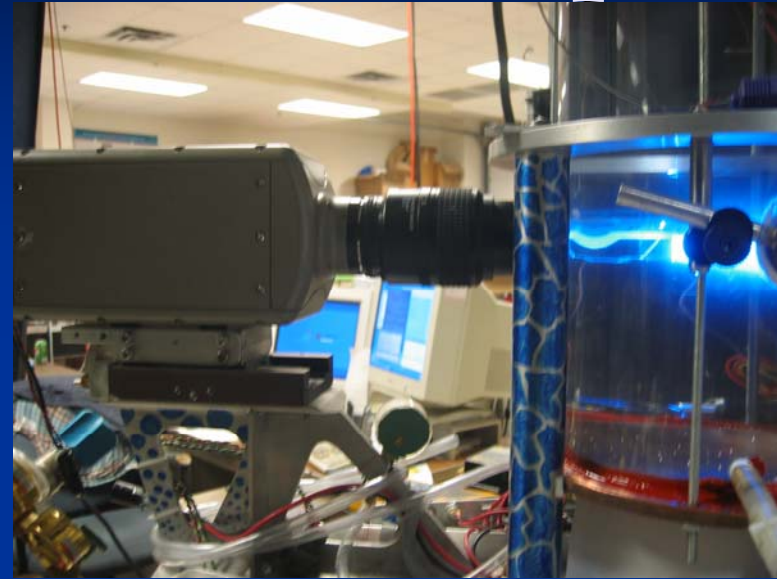
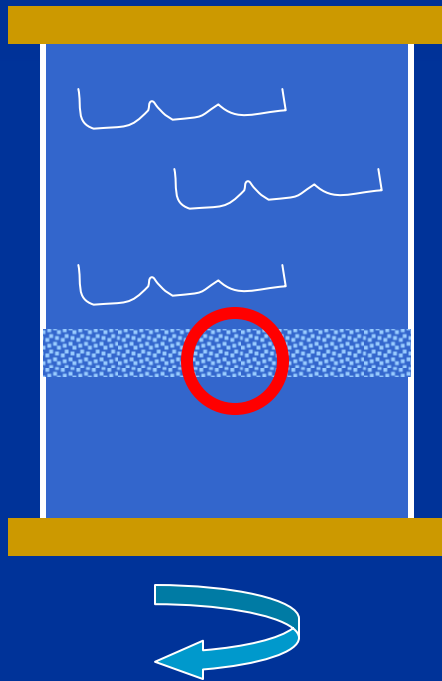
$$Ra = \frac{\alpha g L^3 \Delta T}{\nu K}$$

- Other classifiers: Rossby number **Ro** = $u/\Omega L$,
Reynolds number **Re** = uL/ν

The Experimental Setup

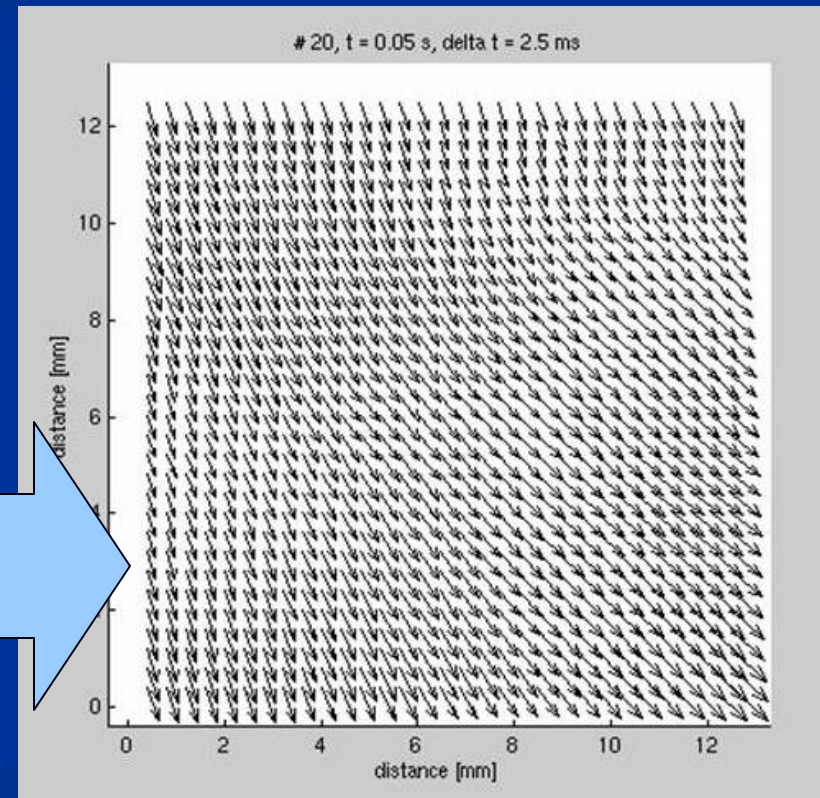
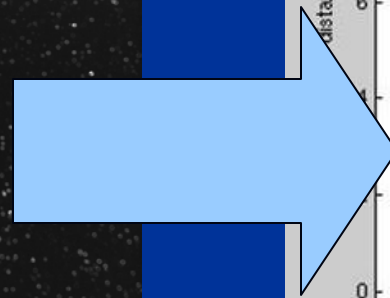
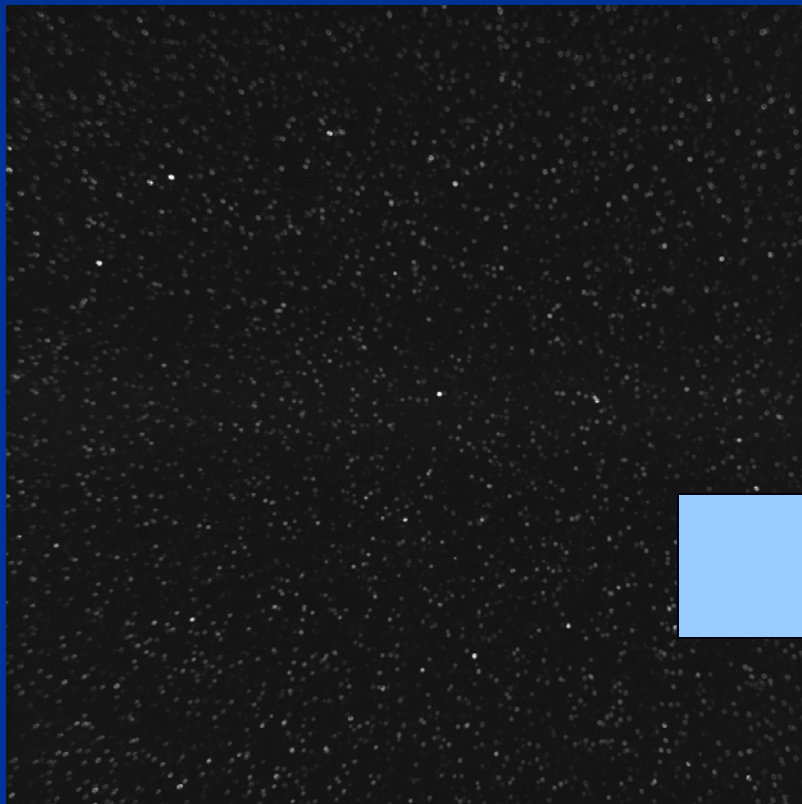


The Experimental Setup



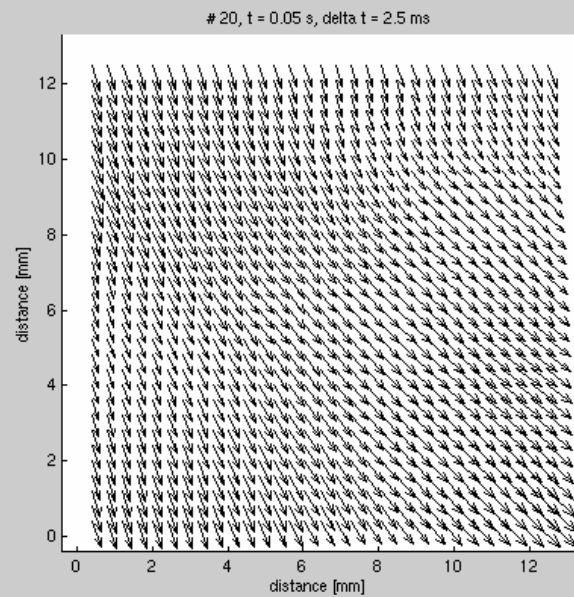
Data Acquisition

- Particle image velocimetry (PIV)

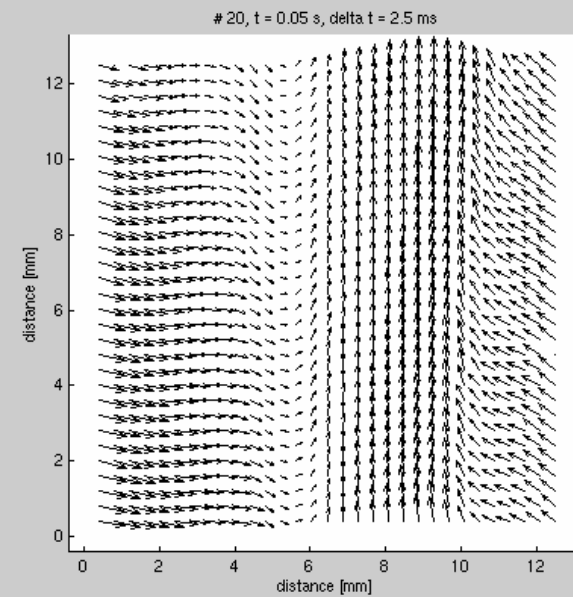


Results

No rotation:

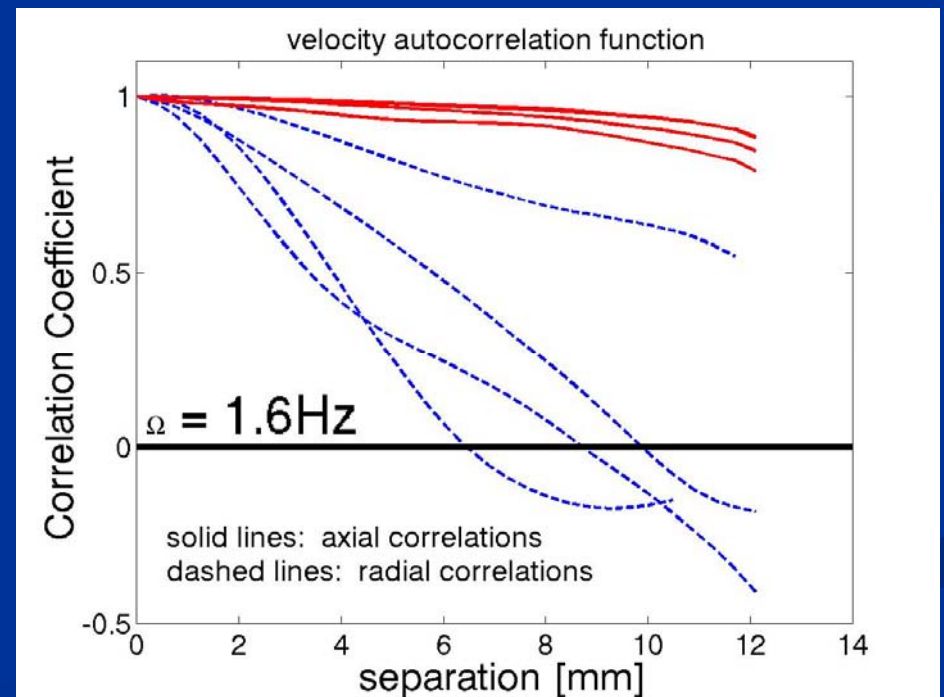
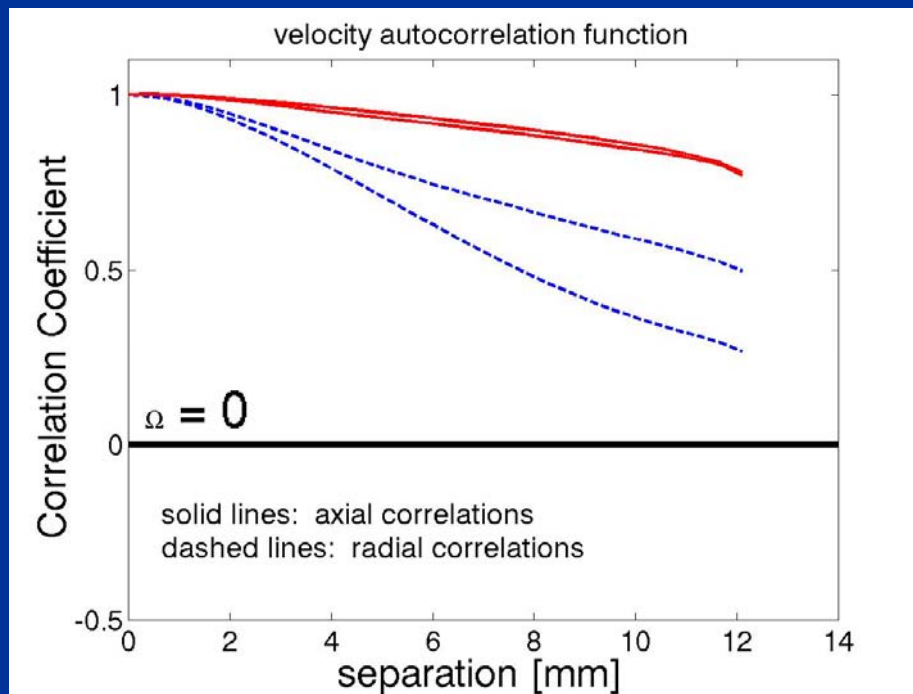


Rotation at 1.6 Hz:



Results

- Correlations between velocities in axial vs. radial direction



Conclusions

- Definite structural difference between rotating and non-rotating cases
- Further investigation needed to find conclusive results