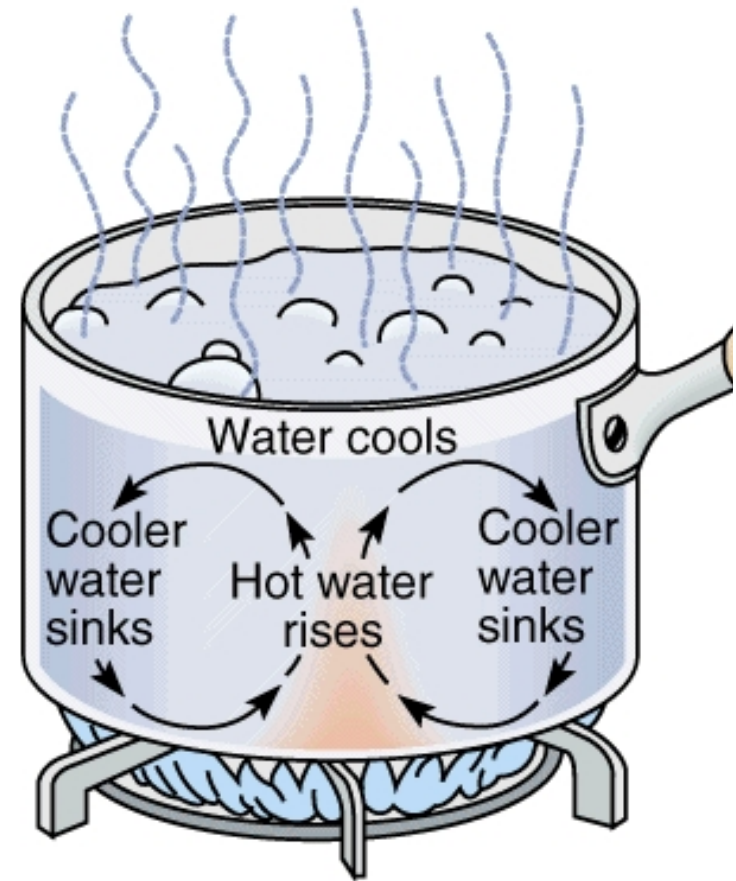


Outline

- Hand in, go over homework problem 3.7
- Convection

Convection

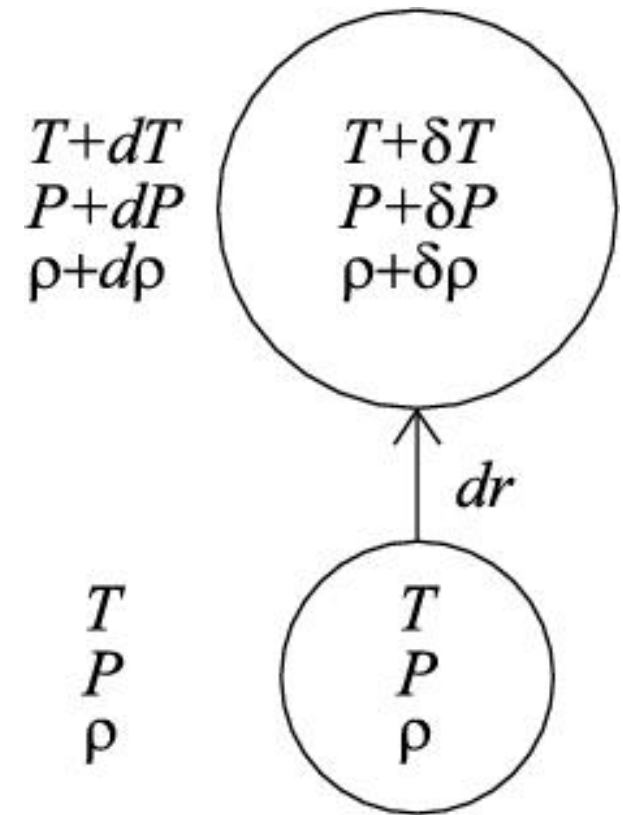
- Convection is mechanical transport of energy
 - Fluid moves, carrying thermal energy
- Generally convection does not produce any net motion of fluid.
- Convection can change temperature and density profile.



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Convection

- When does convection occur?
- Consider a small fluid element that is displaced upwards. The element will *adiabatically* expand to match the pressure at the new location, causing the density and pressure within the element to change.
- If the new density is higher than the surrounding density, $\rho + \delta\rho > \rho + d\rho$, then the element will sink back down. If the density is lower, $\rho + \delta\rho < \rho + d\rho$, then the element will continue to rise leading to convection.
- If convection occurs, it drives down the temperature gradient. Stellar structure codes need to check for convection and modify the temperature gradient if it occurs.



Homework

- For next class:
 - Problem 3-8