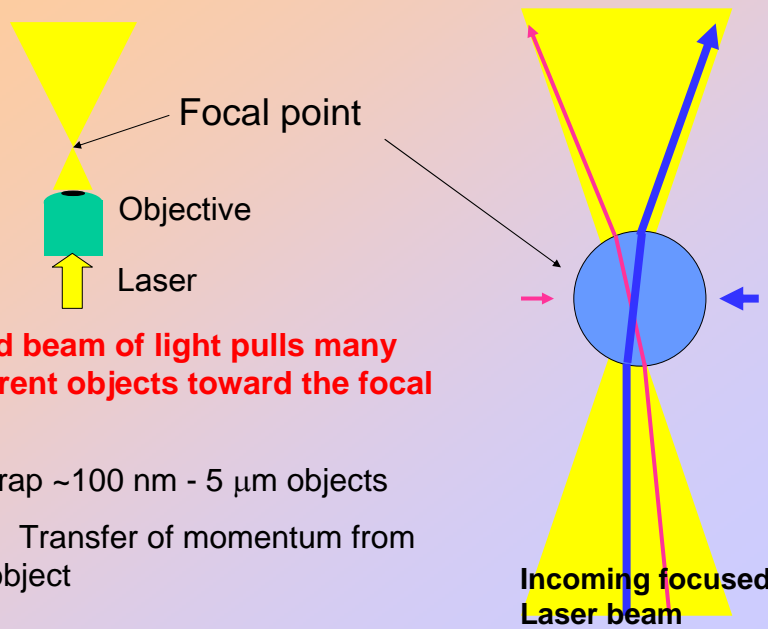


# Phys171 - Fri 2/9

Today: Chapter 4+5

Mon/Tue: Chapter 5

Light can be used to manipulate small objects

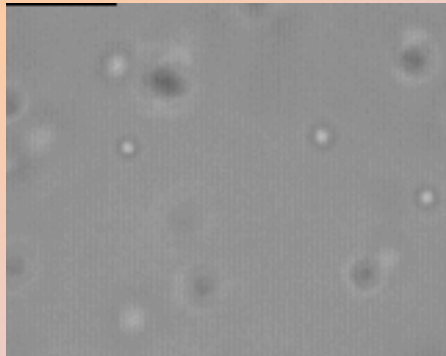


**Focused beam of light pulls many transparent objects toward the focal point.**

-> Can trap ~100 nm - 5  $\mu\text{m}$  objects

Physics: Transfer of momentum from light to object

## Move trapped objects by moving the laser



1 micron diameter silica spheres trapped and moved by a laser

- Apply equilibrium equation (Newton 2<sup>nd</sup> law) to the traffic light and find  $T_3$

- Note: Object pulling a rope with a force: the magnitude of that force,  $T$ , is the tension in the rope

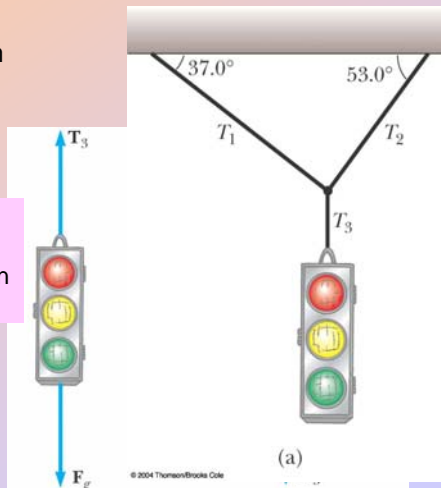


Use Newton's 3<sup>rd</sup> law: Traffic Light pulls on knot with same Magnitude and opposite direction of force as knot pulls on light



- Apply equilibrium equations to the knot and find  $T_1$  and  $T_2$

## Tension in strings



# Accelerating objects

- Forces acting on the objects:
  - Tension (same for both objects, one string)
  - Gravitational force
- Each object has the same acceleration since they are connected
- Draw the free-body diagrams
- Apply Newton's Laws
- Solve for the unknown(s)

