

Today:

- Feedback
- Finish Spatial Resolution (previous notes)
- Time Resolution

• Dye techniques

Time Resolution

First, calculate motion blur. If unacceptable, increase time resolution = shorter exposure time

- 1) Increase shutter speed
 - a. Max is $1/10,000$? 0.1 msec, 100 μ sec? At best.
 - b. High speed camera 30,000 fps $\sim 3 \times 10^{-5}$ sec = 30 μ sec
- 2) Freeze the flow with short light source (won't work for light emitting fluids, i.e. flames)
 - a. Strobe, camera flash $\sim 10^{-5}$ or 10^{-6} sec = 1-10 μ sec
 - b. Pulsed laser 3×10^{-9} sec = 3 nsec or less

Nikon $\frac{1}{4000}$

Canon same

 $\frac{1}{3200}$ Video $\frac{1}{1000}$
Sonyo

SPECIFIC FV Techniques

Choice depends on physics desired

I DYES

II Aerosols / Particles

I Dye

- 1) Want dye to NOT disturb flow
- 2) Want dye to show up - HIGH VISIBILITY
- 3) Special techniques

1) NOT Disturb flow - How?
Minute paper - Groups