

10b.Facilities

Tuesday, February 15, 2011
5:20 PM

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Flow Visualization Equipment and Facilities 02/15/11 MCEN 4228/5228 -002 Flow Visualization: The Physics and Art of Fluid Flow

Here is a list of flow facilities; equipment for checkout is listed below.
Make a reservation with Nick Stites (Nick.Stites@Colorado.edu) to use the big facilities in the ITLL (flume, wind tunnel, sink space room). To check out the smaller equipment in the ITLL, including stuff stored in the Media Shack, see Mike Elliott (Mike.Elliott@Colorado.edu). His office is the checkout office on the 2B level of the ITLL. If he is not there, pick up the checkout phone on the south facing wall near the south stairs of either lab level; an equipment checkout person should be able to help you. Greg Potts (Greg.Potts@Colorado.edu) in the Durning Lab (1B level of ME wing) has a huge assortment of parts for DIY setups; glassware, plexi, pumps, plumbing, fans etc. Mike E has a stash of miscellaneous stuff too.

AIR

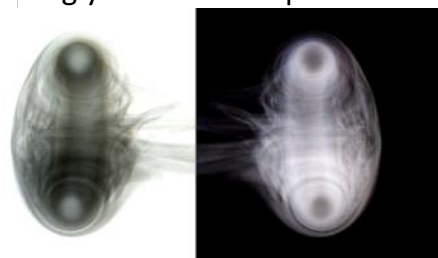
Facility	Lighting	Visualization	Phenomena	Access
Vortex ring generators; zeroblaster, or timed generator. Use in the ITLL sink space (can be made dark), or checkout for home use.	Try projector for light sheet, or strobe	Stage fog	Vortex rings, symmetric and asymmetric	Check out fog generators and timed vortex generator from ITLL; in MediaShack Check out zero blasters and projector from JH
Misc air flows	Strobe for volume vis	Dry ice vapor ¹ humidifiers, steaming pots, medical nebulizers (<\$5) ² Fog generators	Jet flows, positive buoyancy convective flow	JH has nebulizers, humidifier
Color Schlieren, Large system for ECSL 121 only. 2 small systems for	EG&G strobe, provided. Maybe works. Car headlight for other light source; see	Schlieren: Light bent by η gradients Could do stereo with 2 small	Convective flows from warm/hot objects: hands, candles, hair dryers	See Prof. Hertzberg, last two projects only.

¹ Dry ice is solid carbon dioxide. Do not seal into a container, let it breathe. Handle with extreme care; it can freeze flesh. Cover with hot water for best effect, otherwise a water ice shell will form.

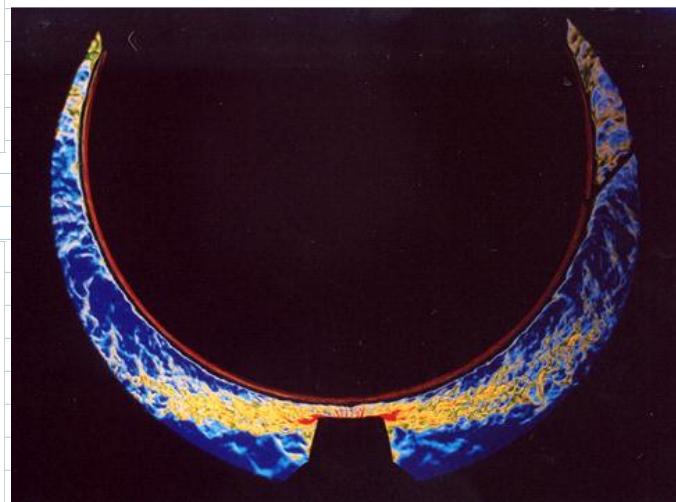
² Medical nebulizers require a small compressed air source. Do not nebulize oils (i.e. canola) without use of a proper respirator or aerosol filter mask: oil coated lungs define pneumonia and asphyxiation.

Some stuff is in my lab, not in Media shack yet.

Surprisingly difficult to capture.



Brynne Sutton, Emrys Hall,
Thomas King, Bethany
Rotherham FV2003



Colleen Stroud FV 2004

home checkout.	Settles' book	systems	(turbulent jet). You may need time to make your own color stops. Can be used in water too.	
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LIQUIDS

Facility	Lighting	Visualization	Phenomena	Access
ITLL Flume	Strobe or 500 Watt work lights or North Star lights New LED floodlights	Free surface or food coloring. Be sure to bleach water clean. Try poster paint dots for surface flows.	Free surface: weirs, hydraulic jump, inclined flow. Wakes: submerged objects, one can inject dye. Jets: coflow, reverse, transverse. Boundary layers and surface flows.	Sign up for flume time in ITLL. See Nick.Stites@Colorado.edu ITLL module engineer. North Star lights in Durning Lab Greg.Potts@
Large Fish Tank in ITLL	Strobe	Food coloring. Be sure to	Short jets, vortex rings,	Check with JH first. ITLL



			Boundary layers and surface flows.	lights in Durning Lab Greg.Potts@
Large Fish Tank in ITLL (50 gal)	Strobe	Food coloring. Be sure to bleach water clean afterwards	Short jets, vortex rings, boundary layers	Check with JH first. ITLL signup/checkout
Hele-Shaw cell	Work light or bounced strobe	Food coloring of detergent, corn syrup, water, etc	Saffman-Taylor instability	ITLL checkout Needs glass top sheet
Reversible Flow Demo	Any lights will work; everything is slow	Food coloring	Glycerin or corn syrup. Students write in the fluid with dye and rotate the inner of two cylinders slowly. Upon reversing the direction, the original writing reappears.	ITLL checkout (take home 2 days). Two sets are available.

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Tanner Ladtkow, Tim Read
FV 2006