PHY 711 Classical Mechanics and Mathematical Methods
10-10:50 AM MWF Olin 103

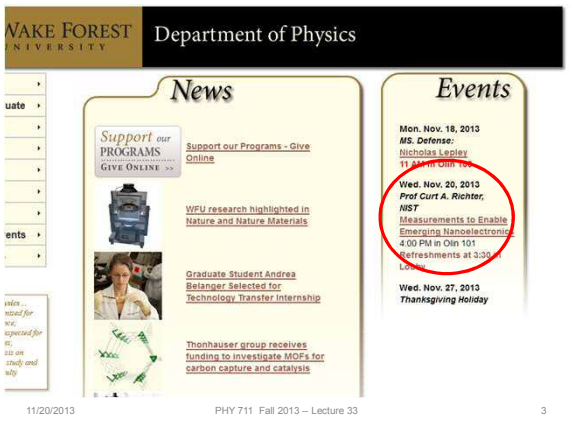
Plan for Lecture 33:

Chapter 10 in F & W: Surface waves

-- Non-linear contributions and soliton solutions

25	Fri, 10/25/2013	Chap. 5	Rigid rotations	
	Mon, 10/28/2013	No class	Take-home exam	
	Wed, 10/30/2013	No class	Take-home exam	
	Fri, 11/01/2013	No class	Take-home exam	
26	Mon, 11/04/2013	Chap. 8	Oscillations in two-dimensional membranes	Take-home exam due
27	Wed, 11/06/2013	Chap. 9	Physics of fluids	#22
28	Fri, 11/08/2013	Chap. 9	Physics of fluids	#23
29	Mon, 11/11/2013	Chap. 9	Sound Waves	#24
30	Wed, 11/13/2013	Chap. 9	Sound Waves	#25
31	Fri, 11/15/2013	Chap. 9	Non linear effects in Sound	#26
32	Mon, 11/18/2013	Chap. 10	Surface waves	
33	Wed, 11/20/2013	Chap. 10	Surface waves	
34	Fri, 11/22/2013	Chap. 11	Heat conduction	
35	Mon, 11/25/2013	Chap. 12	Viscous fluids	
	Wed, 11/27/2013		*Thanksgiving Holiday*	
	Fri, 11/29/2013		*Thanksgiving Holiday*	
36	Mon, 12/02/2013		Student presentations I	
37	Wed, 12/04/2013		Student presentations II	
38	Fri, 12/06/2013		Student presentations III	
	Mon, 12/09/2013		Begin Take-home final	

preparation for presentations



WFU Physics Colloquium

TITLE: Measurements to Enable Emerging Nanoelectronics

SPEAKER: Dr. Curt A. Richter,

NanoElectronics Group,
Semiconductor & Dimensional Metrology Division,
Physical Measurement Laboratory,
National Institute of Standards and Technology

TIME: Wednesday November 20, 2013 at 4:00

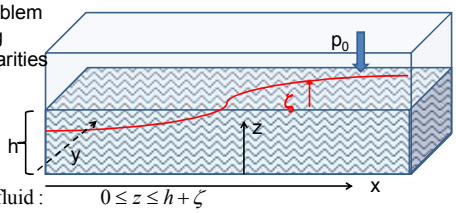
PLACE: Room 101 Olin Physical Laboratory

Refreshments will be served at 3:30 PM in the Olin Lounge. All interested persons are cordially invited to attend.

ABSTRACT

Traditional computing devices have been based upon the scaling of silicon-based complementary metal oxide semiconductor (CMOS) devices, but this scaling is reaching fundamental limits. The semiconductor industry is facing difficult challenges extending integrated circuit technology performance, and innovative technologies to store and manipulate are being aggressively pursued. These emerging technologies rely on the integration of novel materials such as graphene, nanowires, and compound semiconductors as well as new device structures such as tunnel-FETs and resistance change memories. New measurements are needed to enable research, development, and

General problem including non-linearities



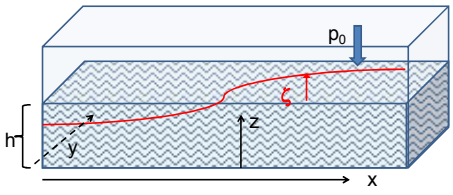
Within fluid : $0 \le z \le h+\zeta$

$$-\frac{\partial \Phi}{\partial t}+\tfrac{1}{2}v^2+g(z-h)=\text{constant}$$ (We have absorbed p_0 in our constant.)

$$-\nabla^2\Phi=0$$

At surface : $z=h+\zeta$ with $\zeta=\zeta(x,y,t)$

$$\frac{d\zeta}{dt}=\frac{\partial\zeta}{\partial t}+v_x\frac{\partial\zeta}{\partial x}+v_y\frac{\partial\zeta}{\partial y}$$ where $v_{x,y}=v_{x,y}(x,y,h+\zeta,t)$



Further simplifications; assume trivial y-dependence

$\Phi=\Phi(x,z,t)$ $\zeta=\zeta(x,t)$

Within fluid : $0 \le z \le h+\zeta$

At surface : $v_z(x,z=h+\zeta,t)=-\frac{\partial\Phi}{\partial z}=\frac{d\zeta}{dt}$

Some links:

- Details of soliton equations
- Maple animation
- Website – http://www.ma.hw.ac.uk/solitons/