Periodic Systems Condensed Syllabus

Course summary: **http://www.physics.oregonstate.edu/~grahamat/COURSES/ph427/**
This paradigm introduces the fundamental vibrational states of classical periodic systems, and the fundamental quantum states of periodic quantum systems. This knowledge forms the basis of the theory of solid state physics. Many of the systems we will study have relevance to photonic crystals, circuit theory and other engineering applications.

Instructor
Matt W. Graham Office hours: Mon 2-3pm, Wed 2-3pm, 375 Weniger Hall (Class in Rm 212)
Teaching/learning assistant: Mackenzie Lenz and Brendan Vischer

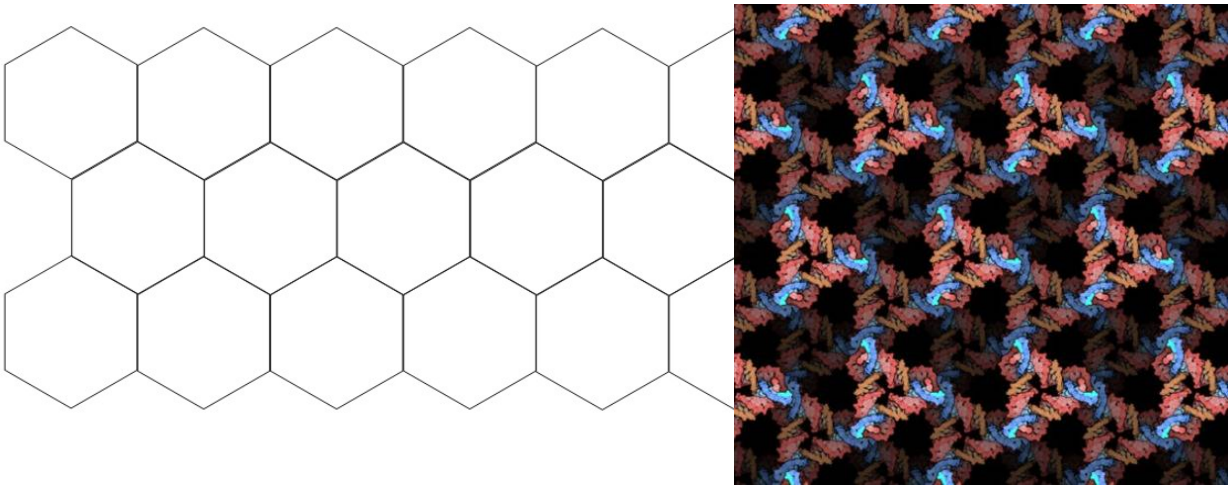
Problem Sets
Problem sets are typically due at 5pm. Late problems sets will be graded, until solutions have been posted. A late penalty of 10% (min) to 30%(max) will applied each day at the discretion of the grader for homework late for one day of M-F "work week". >3 day late problems sets must still be submitted even though we cannot give formal credit for them.

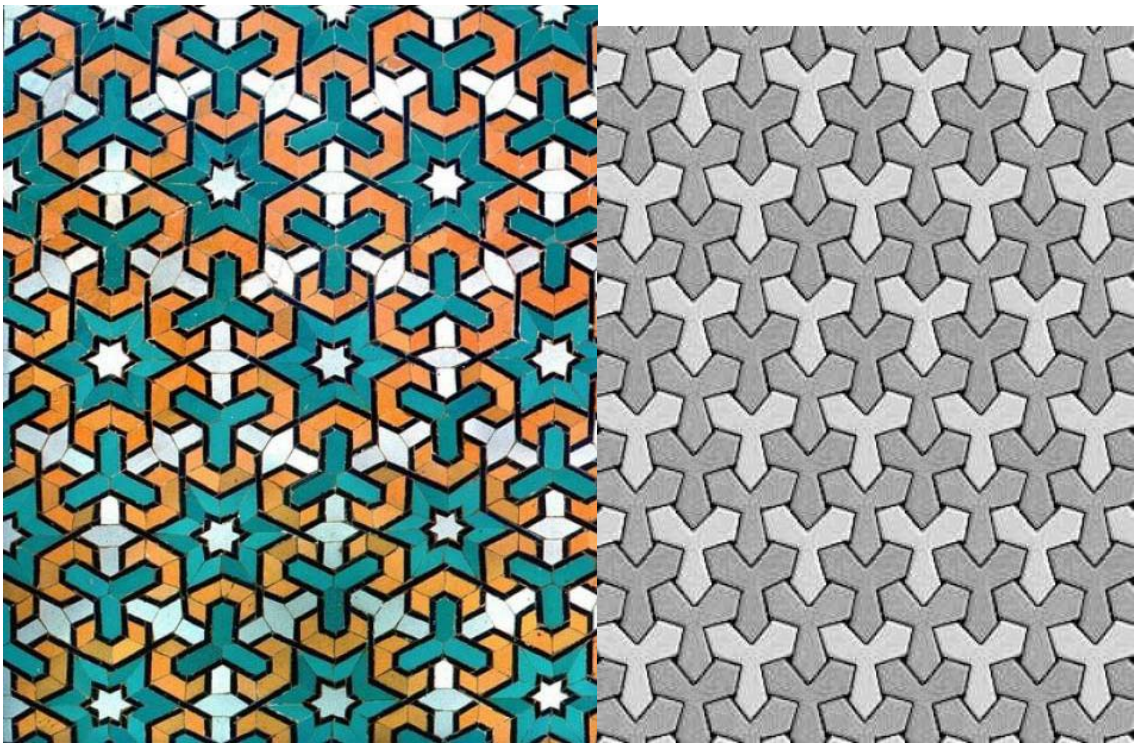
Final: See university final exam schedule for exam time. You are allowed to bring a calculator and an aid sheet. Cheat aid size = 8.5”x11”, one side, handwritten and submitted w/your exam.

Grade break-down: Homework 35%; Journal Club Talk 15%; Final 50%.

~Feb 2016 ~				
Mon	**Tue**	**Wed**	**Thu**	**Fri**
22 Coupled Oscillators	23 Coupled Oscillators PhET Lab 1	24 **-PS1 (0,1,2) due** Dispersion for 1D mass/spring system	25 Dispersion for 1D mass/spring system	26 Lattices at finite temperature **-PS1(3,4)due**
29 Phonon Dispersion & heat capacity **-Journal proposals due**	1 Lattices (diatomic materials, final topics)	2 **-PS2 (1,2) due** Double potential well	3 Linear combination of atomic orbitals (LCAO) PhET Lab 2	4 **-PS2 due** Electronic band structure
7 **Journal Presentations**	8 **Journal Presentations** - LCAO model	9 **-PS3 (1,2) due** Tight-Binding Model	10 Electronic Band Structure	11 Review, session I **-PS3 due**
14 FINAL EXAM, PH427 304 and 304F	15	16	17	18

EXERCISE: Draw an example "unit cell" on the following.





Deep Physical Idea: Once you successful describe the physics inside a single unit cell, you have successfully described the complete physics the extended system.

(*think back to our definition of Noether's Theorem*)