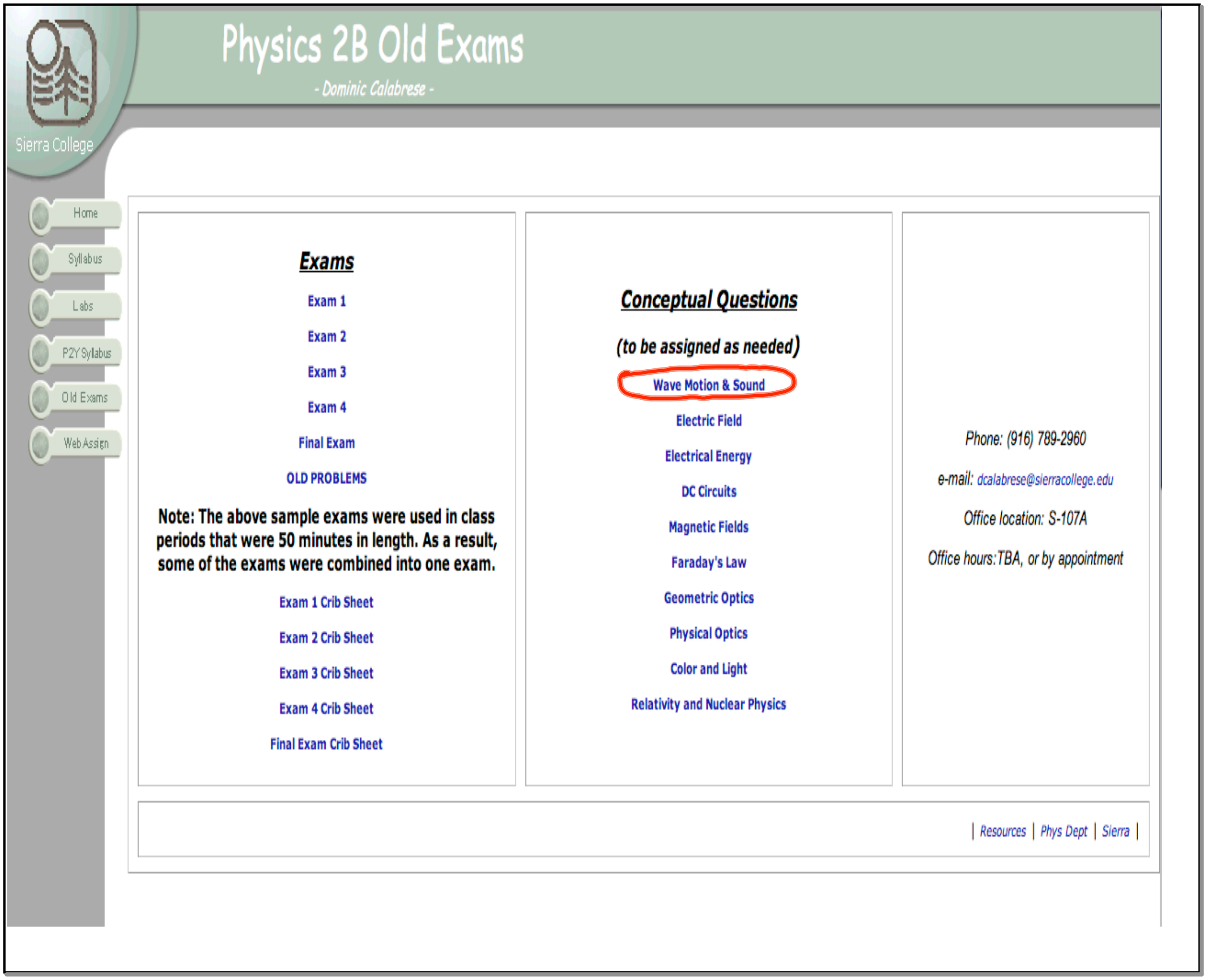
Sierra College
Physics 2B Old Exams
- Dominic Calabrese -
Home
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P2Y Syllabus
Old Exams
Web Assign
Exams
Exam 1
Exam 2
Exam 3
Exam 4
Final Exam
OLD PROBLEMS
Note: The above sample exams were used in class periods that were 50 minutes in length. As a result, some of the exams were combined into one exam.
Exam 1 Crib Sheet
Exam 2 Crib Sheet
Exam 3 Crib Sheet
Exam 4 Crib Sheet
Final Exam Crib Sheet
Conceptual Questions
(to be assigned as needed)
Wave Motion & Sound
Electric Field
Electrical Energy
DC Circuits
Magnetic Fields
Faraday's Law
Geometric Optics
Physical Optics
Color and Light
Relativity and Nuclear Physics
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Office hours:TBA, or by appointment
| Resources | Phys Dept | Sierra |

Moving source

$$\lambda' = \lambda - v_s T$$

$$v = f\lambda \qquad f = \frac{v}{\lambda'}$$

$$f' = \frac{v}{\lambda - v_s T} \qquad T = \frac{\lambda}{v}$$

$$f' = \frac{v}{\lambda - v_s\left(\frac{\lambda}{v}\right)} = \frac{v}{\lambda\left(1 - \frac{v_s}{v}\right)}$$

$\frac{v}{\lambda}$ = original frequency f

$$f' = f\left(\frac{1}{1 - \frac{v_s}{v}}\right) = f\left(\frac{v}{v - v_s}\right)$$

source away from observer

$$f' = f\left(\frac{v}{v + v_s}\right)$$

Moving Observer

Observes # of waves that pass a stationary observer in a time t.

$$\# \text{ of waves} = \frac{v t}{\lambda}$$

$$\# \text{ of waves/sec} = \frac{v}{\lambda} = \text{frequency}$$

Now let observer move toward source with speed v_o

$$\# \text{ of waves} = \frac{(v + v_o) t}{\lambda}$$

$$\# \text{ of waves/s} = \frac{v + v_o}{\lambda} = \frac{v + v_o}{\frac{v}{f}} = f\left(\frac{v + v_o}{v}\right)$$

$$f' = f\left(\frac{v + v_o}{v}\right)$$

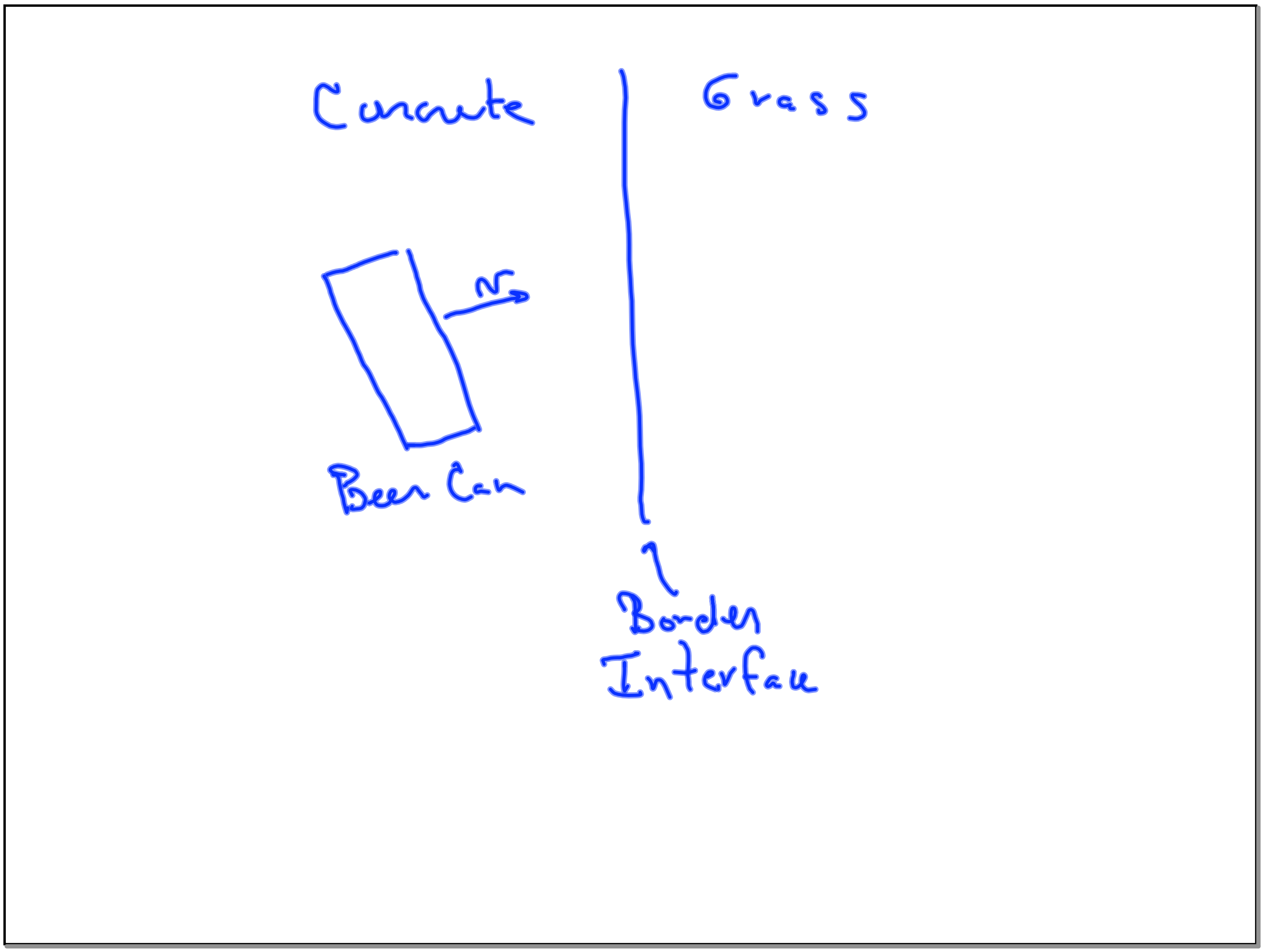
Notice that the Doppler shift due to source motion is different from that of observer motion. In the case of light, both effects produce the same shift because the speed of light is independent of reference frame.

- A source emits a sound wave with a frequency of 426.6 Hz while it moves away from an observer with a speed of 15 m/s relative to the ground. If the observer is moving toward the source at 5 m/s relative to the ground, what is the frequency heard by the observer? Use 343 m/s for the speed of sound.

$$f' = f\left(\frac{v \pm v_o}{v \pm v_s}\right)$$

$$f\left(\frac{v + v_o}{v + v_s}\right) = 426.6\left[\frac{343 + 5}{343 + 15}\right]$$

$$f = 414.7\ Hz$$


Concrete
Grass
v
Beer Can
Border
Interface

- The G string on a guitar has a fundamental frequency of 196 Hz and a length of 0.62 m This string is pressed against the proper fret to produce the note C, whose fundamental frequency is 262 Hz. What is the distance L between the fret and the end of the string at the bridge of the guitar ?

$f_G = 196\ Hz \qquad L = 0.62m$

$L = \frac{\lambda}{2} \qquad \lambda = 2L$

$\lambda = 1.24m$

$v = f\lambda = (196\ Hz)(1.24m)$

$f_c = \frac{v}{\lambda} = \frac{(196)(1.24)}{\lambda} = 262$

$262\ Hz = \frac{(196)(1.24)}{2L_c}$

$L_c = \frac{(196)(1.24)}{2(262\ Hz)} = 0.46m$