

Physics 142 - September 2, 2014

Physics 142 – Electricity and Magnetism
Fall term 2014, University of Rochester
Information, Syllabus, and Schedule

P142 is a physics survey course in electricity and magnetism designed for physics majors. Students with other majors in the physical sciences or engineering who desire more depth than would be seen in P122 are welcome. The topics to be covered in P142 include electrostatics, electrical potential, magnetostatics, electric and magnetic fields in matter, current, capacitors, DC and AC circuits, induction, Maxwell's equations and, electromagnetic waves, and a bit of relativity and geometrical optics. Students are expected to have knowledge of basic calculus. It is also assumed that students have taken a strong, calculus-based introductory course in mechanics in preparation for P142.

e-mail: Steven.Manly@rochester.edu
Phone: 275-8473
Office: B+L 203E

Enter lobby of B+L
Off quad
... go right as
far as you
can go.

- IF you did NOT get email yesterday let me know
- Sent out syllabus update

1ST problem set due Sept. 11
Will post it on web later today

No workshops this week

Workshops probably begin next week (STAY TUNED)

Scheme	Exam 1	Exam 2	Final exam	Lab	Prob sets	Presentation
1	20%	20%	21%	15%	9%	15%
2	0%	30%	31%	15%	9%	15%
3	30%	0%	31%	15%	9%	15%



Charles Augustin Coulomb (1736-1806)
France
Coulomb's Law ~1875

$$F_G = - \frac{G M_1 M_2 \hat{r}}{r^2}$$



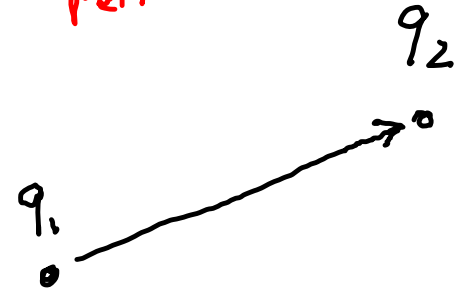
$$F_E = \frac{k q_1 q_2 \hat{r}}{r^2}$$

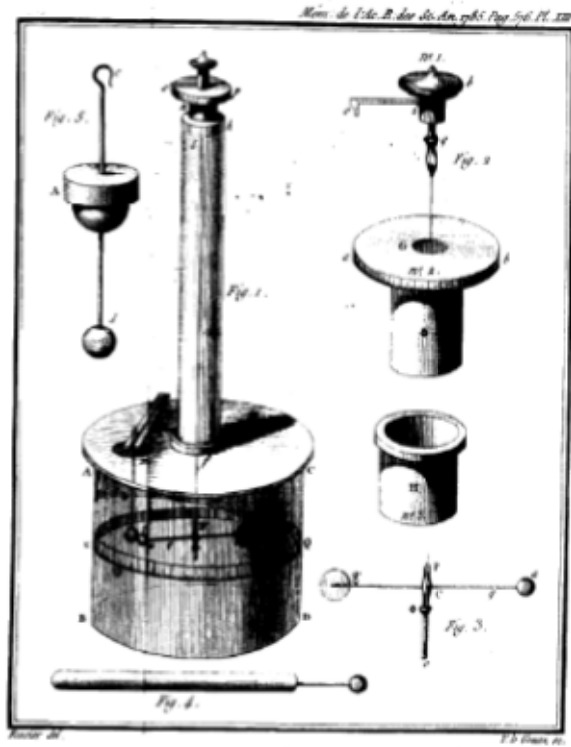
$$\frac{1}{4\pi\epsilon_0}$$

Permittivity of free space

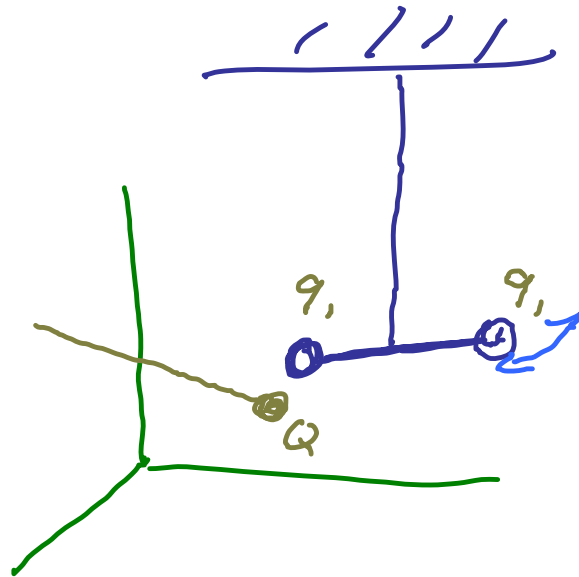
$$8.99 \times 10^9 \frac{\text{NM}^2}{\text{C}^2}$$

$$\epsilon_0 = 8.85 \times 10^{-12} \frac{\text{C}^2}{\text{NM}^2}$$





Torsion balance



$$F \propto \frac{q_1 q_2}{r^2}$$

Electric charge is conserved

Electric charge is Quantized

$$|e| = 1.6 \times 10^{-19} \text{ coulombs}$$

$+\frac{2}{3}$	u	c	t
$-\frac{1}{3}$	d	s	b

qqq

q \bar{q}

Baryons

Mesons