

Physics 114 - Jan 19, 2006

you've seen this before

Sets scale for strength
of grav. force

$$\vec{F} = - \frac{G m_1 m_2}{r^2} \hat{r}$$

Negative Sign
makes force
ATTRACTIVE



Mass only comes in one "Type" ... only one sign
in formula

Suppose we lived in a world with anti-gravity

Suppose we have MASS and UNMASS

■ MASS-MASS \Rightarrow ATTRACTIVE

■ MASS-UNMASS \Rightarrow repulsive

■ UNMASS-UNMASS \Rightarrow ATTRACTIVE

In This case the equation Above Still works if
mass has "+" sign
un mass has "-" sign

Wouldn't this be STRANGE? Nature has final word
and we do NOT appear to have Antigravity.

But Gravitation is just 1 of the 4 fundamental
forces of nature for which we have evidence

Gravitation, electromagnetism, Strong nuclear force
and weak nuclear force

This is what we will study for 1st half of P114

Coulomb's
Law -
equivalent to
what you see
above for
gravity

$$\vec{F} = k \frac{Q_1 Q_2}{r^2} \hat{r}$$

In This case Q comes in two types "+" and "-"
So force has both attraction and repulsion

Q is the "charge" of electromagnetism
comes w/ 2 Types

M is the "charge" for gravitation
only one type (that we've discovered
so far)

↙
1 sign

k is much bigger than G

Electromagnetism is a much stronger
force than gravitation