Physics 114 - Jan 19, 2006

You've seen this before.

\[ \vec{F} = -\frac{G m_1 m_2}{r^2} \]

Sets scale for strength of grav. force

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 2 Mass and 2 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 anti-gravity.

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

\[ F = \frac{k \cdot Q_1 \cdot Q_2}{r^2} \]

In this case \( Q \) comes in two types "+" and "-" so force has both attraction and repulsion.
\( Q \) is the "charge" of electromagnetism.

\( M \) is the "charge" for gravitation

only one type (that we've discovered so far)

I sign

\( R \) is much bigger than \( G \)

Electromagnetism is a much stronger force than gravitation.