

Re: Can inverse gravity waves cancel out Earth's gravity in selected areas?

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Source: <http://sci.tech-archive.net/Archive/sci.physics.relativity/2006-10/msg01791.html>

- *From:* sal <pragmatist@xxxxxxxxxxx>
 - *Date:* Fri, 20 Oct 2006 16:25:05 -0400
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On Fri, 20 Oct 2006 12:48:52 -0700, TrekJunky wrote:

Hello Sal and Sue,

Are you both telling me that radiation pressure can be caused by massless photons?

I confess I haven't been reading Sue's posts in this thread. But that's certainly what I've been telling you, and it's probably what she's been saying, too.

But again, photons have zero REST mass. That means that if you could stop a photon and weigh it, while it was STOPPED it would have zero mass.

!!BUT!! mass == energy and a photon carries energy, so a photon in flight can also be said to have mass.

There is a point here which you should be aware of: It is often said, somewhat sloppily, that objects in motion "gain mass" as they accelerate. When something is moving faster, it's "got more mass" than it has when it's moving slower. And the ratio of the "mass" of a particle moving at the speed of light, to the mass of that same particle AT REST, is infinity. Something moving at C is infinitely more massive than it is when it's stopped.

Photons, though, would have ZERO mass when they're stopped (if they could be stopped). When they're moving at C they have infinity times that much ... and infinity times zero is, in this case, a finite quantity.

So, photons in flight, moving at C, do, indeed, carry mass.

They have momentum, and they even have a gravitational field, just like anything else which has mass.

Does this help at all?

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(By the way I may get yelled at for this post, since I've been pretty sloppy with the terminology. But I think the main points, as stated here, are not too misleading.)

Because energy reacts with matter? Has anyone ever heard that light sometimes acts as a wave and sometimes acts as a particle? I have a hard time understanding how energy can apply a force if it has no mass. I apologize for my ignorance, but I would like to learn. In my simple mind, the reaction in matter to light is heat. Is that heat from the matter or from the light? I am not good in math either and Sue sent me to a link that used variations on $E=mc^2$. <http://farside.ph.utexas.edu/teaching/em/lectures/node90.html> In my mind m is mass which can be converted to E (energy) and back again. How does that relate to radiation pressure? sal wrote:

On Wed, 18 Oct 2006 08:59:19 -0700, Mike wrote:

Igor wrote:

Mike wrote:

TrekJunky wrote:

Hello Sue,

I would like to answer you question about how I would measure the mass of light. I would like to approach it by stating a few facts to see if you agree with them:

Light has no mass, or if it has some it is beyond any measurement accuracy.

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1) Solar
Sail space
ships are
propelled
by the
pressure of
light
on the
"sails" not
solar
wind(subatomic
particles) as
some might
think.

That is not your usual notion
of pressure.

Why not? Light has momentum. Momentum
changing direction exerts
force.
And force per unit area is pressure. It's that
simple.

Idiot. Are you the sam eposter asking these stupid questions?
How do
you make light change direction other than making it pass
through a
gravity field?

Well, as one example, a mirror works pretty well.

And by the way, that's what a solar sail is. In the simplest case of
the sail perpendicular to the incoming light, the photons reverse
direction when they hit the sail, their momentum flips sign as a result,
and the sail gains twice the momentum of each photon in the process.

The sail feels a force as a result of reflecting the light, and if
someone on the ship measures the force on the sail as a whole and
divides by the area of the sail, they find the radiation pressure which
is being exerted on the sail.

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Nospam becomes physicsinsights to fix the email
I can be also contacted through <http://www.physicsinsights.org>

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