

Re: Gravity on a torus

Source: <http://sci.tech-archive.net/Archive/sci.physics.research/2007-10/msg00127.html>

- *From:* torre@xxxxxxxxxxx
 - *Date:* Sun, 28 Oct 2007 17:59:50 +0000 (UTC)
-

This discussion is funny to me because apparently all the string theory guys have solved this already—since they speak of the description of gravity in an alternative world say 2 space dimensions, where one dimension is compactified and they claim to know what the gravitational potential would be in such a case.

I don't think string theory is meant to work as a gravity theory in 2-d. One is instead building a gravity theory, say, in ten dimensions using (quantum) fields in 2-d.

I think you must try to solve Poisson equation on the torus.

This would seem to be exactly what is needed. A complication is that a necessary condition for the Poisson equation (with a well-behaved, non-negative mass density) to have a solution on the torus is that the mass density vanishes everywhere!

To see this, just integrate the equation over the torus and use the divergence theorem. This implies the total mass vanishes. Since the mass density is non-negative, it must vanish everywhere.

charlie torre

.