

Supplement to Marsh White Award Report 2014

Society of Physics Students at New Mexico State University

Gravity simulator

Please refer to <https://www.youtube.com/watch?v=MTY1Kje0yLg&app=desktop>

For our goal with this experiment.

Purpose:

We built a gravity simulator using a sheet of spandex stretched evenly over a large PVC tube. This was constructed to improve and update our pre-existing, and future outreach events. The gravity simulator gives students an interesting perspective of how massive objects warp space-time around them.

Apparatus:

Our gravity simulator is made up of two parts: A rigid PVC skeleton and a stretchy and flexible spandex surface. The PVC skeleton (as shown in the pictures) is attached to a ring of rebar inside a common garden hose to provide a surface for the spandex to lay evenly along.

The spandex sheet is then stretched evenly across the ring. Once an even surface is attained, a weight on the order of one to five kilograms is set in the center of the spandex, creating a cone shaped "gravity" gradient. Any round object will be inclined to roll toward the weight in the center. This "attractive" force, when combined with a motion tangent to the ring, will result in the round object "orbiting" the weight in the center, thus simulating a gravity field like that of a solar system.

More round objects can be added to the surface, and each object will exert a "gravitational" force on one another. This can result in complicated motions. For example, motions like marbles orbiting marbles while both marbles orbiting the center weight.

Pictures Below



Frame





Gravity Simulator in action



Gravity Simulator in action



Gravity Simulator in action