

GRAVITATIONAL ASTROPHYSICS WITH DR PAUL LASKY

TALKING POINTS

1. When were gravitational waves predicted by Albert Einstein? (See the very start of the article)
2. Who first proposed the existence of gravitational waves? What is the difference between “proposed” and “predicted”? (See the very start of the article)
3. What are gravitational waves? (See the very start of the article)
4. When did the LIGO experiment detect the first gravitational wave? (See *How were these gravitational waves detected?*)
5. Which two properties do gravitational waves have that are unique and of huge importance to researchers? (See *Why are gravitational waves so important to gravitational astrophysics?*)
6. What might hinder an attempt to observe light from a distant star? (See *Why are gravitational waves so important to gravitational astrophysics?*)
7. What speed does light travel at? What about gravitational waves? (See *Imagine this* and the very start of the article)

ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

MAKE A MODEL OF A BLACK HOLE

You will need:

A large piece of elastic bandage (about 40 cm x 40 cm)

A small marble

A heavy ball, such as one used in a game of boules

Get two people to hold the ends of the bandage and stretch it out until it becomes taut. Place the marble on the bandage and make it roll across the surface. Imagine this is a ray of light travelling through space. Swap the marble for the heavy ball and see how it deforms the fabric. Imagine this is space curving around a black hole. Put the marble back on the bandage and watch how it moves. Try to make the marble move quickly. What happens? When the marble passes the large ball, it should revolve around it before falling towards it. This is what happens with black holes: Their gravity deforms space in such a way that light or other objects fall in and cannot escape.

This activity was taken from universe Awareness:

<https://www.unawe.org/activity/eu-unawe1308/>



Here's Paul with a model of a black hole at Monash University.

BE AN AMATEUR ASTROPHYSICIST

Citizen science is an exciting and growing enterprise where professional scientists team up with the public to analyse data and contribute to scientific research. The Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA) has created several Zooniverse Citizen Science Projects which are listed below:

1. Gravity Spy: Help search for gravitational waves in the LIGO data by classifying “glitches” – features that result from sources of instrumental and environmental noise.
2. Local Group Cluster Search: Identify star clusters in images taken by the Hubble Space Telescope and the Dark Energy Survey Camera of our closest galaxy neighbours.
3. Zooniverse: The Zooniverse enables everyone to take part in real cutting-edge research in many fields across the sciences, humanities, and more. The Zooniverse creates opportunities for you to unlock answers and contribute to real discoveries.