

10/29/07

Astronomy in the News -

Pic of the day - Comet
Holmes



Check out

Dr. Quantum in Flatland

Right in spirit, wrong in some essential details. See if you can figure out what those are.

<http://youtube.com/watch?v=KhbGYn7aAUk>

Embedding diagram - 2 D “shadow” of 3 D curved space, preserves basic aspects of geometry, whether curved or not, and, if curved, how.

Meaning of ***flat space*** in 3 (or higher) dimensions

If 3 D space is flat: $C=2\pi r$; sum of angles of triangle = 180° ; parallel beams of light never cross ***in 3D***.

The embedding diagram of 3D flat space is a flat 2D plane

In curved 3D space, the flat space answers will be wrong: 2D embedding diagram will help to illustrate that.

One Minute Exam

In a curved space

- A) Straight lines always connect to themselves
- B) Straight lines are the shortest distance between two points
- C) There are no straight lines
- D) The sum of the interior angles of a triangle is 180 degrees

Invert balloon - 2 D embedding diagram of curved 3 D space around
gravitating object

Properties of this curved space that are preserved in the embedding
diagram:

$$C < 2\pi r$$

Sum of angles of triangle not equal 180° (can be $>$ or $<$)

Parallel lines diverge or cross