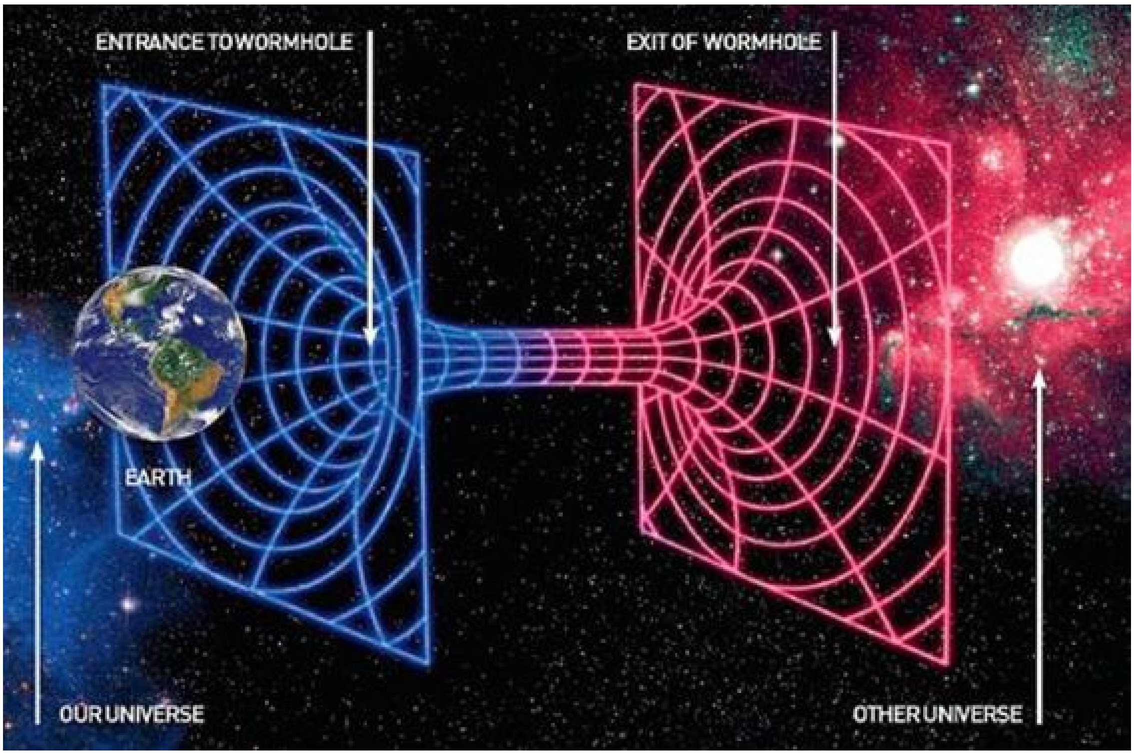
Teoria das cordas - Teoria M

Há algum tempo, preparando uma final, encontrei essa teoria, a teoria das cordas ou a "M teoria", porque é a teoria mágica, que além de ser física puramente teórica está se configurando para ser o que na modernidade foi definido como a GRANDE TEORIA; um conhecimento capaz de explicar o funcionamento do universo tal como é e que, pela sua natureza, não contradiz a física quântica nem a mecânica newtoniana …

Eu deixo algumas fontes …

O que você vê aqui, você pode encontrar facilmente.

A maioria dos livros está em inglês ... se eles estiverem interessados, eles me enviam um deputado e os envio por correio.



Teoria das cordas

A proposta natural para alcançar esta descrição unificada é a modificação do comportamento das partículas em energias muito elevadas, de modo que o comportamento patológico da gravidade é corrigido nas energias da ordem da escala da Plank.

As modificações seriam muito pequenas nas situações mais conhecidas, mas entrariam de maneira essencial na explicação do comportamento da Natureza em um sistema de gravidade muito intenso, onde a curvatura do espaço-tempo é muito alta (raios de curvatura da ordem do comprimento de Planck, isto é 10-35 m), como nos buracos negros, ou no início do Universo.

A teoria das cordas (ou superconjunto) propõe exatamente essa modificação.

Especificamente parte da hipótese de que partículas elementares não são pontuais, mas objetos extensos em uma dimensão (realmente cordas).

O tamanho dessas cordas é muito pequeno, muito menor do que as escalas menores de comprimento medidas experimentalmente (10-17 m).

Embora seja normalmente assumido que esse tamanho é da ordem do comprimento de Planck (10-35 cm), em alguns modelos esse tamanho pode ser maior (na ordem de 10-18 cm).

Em energias muito baixas, não há resolução suficiente para observar o tamanho das cordas, e seu comportamento é reduzido ao de partículas pontuais.

No entanto, em energias muito altas, a natureza extensa das cordas começa a manifestar e modifica o comportamento das partículas de modo que suas interações gravitacionais, calculadas em teoria, não exibam nenhum comportamento patológico.

Um excelente documentário online

Parte 1

link: http://www.youtube.com/watch?v=-BGeZbgZ3b8

Parte 2

link: http://www.youtube.com/watch?v=n_Ph2zFGeUo&feature=related

Parte 3

link: http://www.youtube.com/watch?v=IBBfTyyH8Fk&feature=related

Parte 4

link: http://www.youtube.com/watch?v=DP8Ijjv7rj8&feature=related

Parte 5

link: http://www.youtube.com/watch?v=YkjzdRJ_LqQ&feature=related

Há muito mais se você quer investigar ... é emocionante.

Espero que você goste .....

Saluditos .....

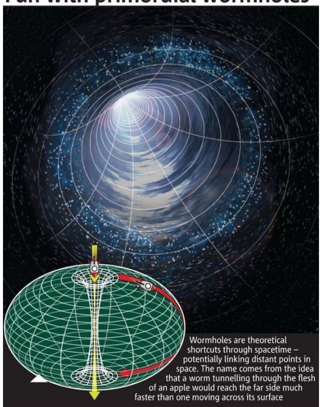
https://www.taringa.net/posts/videos/13673118/Teoria-de-Cuerdas---Teoria-M.html?dr

Taringa!

São Paulo, SP, 31 Marco de 2018

Mkmouse

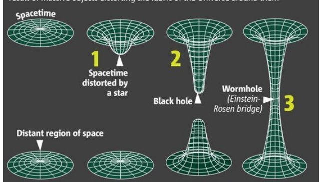
Fun with primordial wormholes



Wormholes are theoretical shortcuts through spacetime – potentially linking distant points in space. The name comes from the idea that a worm tunnelling through the flesh of an apple would reach the far side much faster than one moving across its surface

How do wormholes form?

When Einstein formulated his Theory of General relativity, he revealed that gravity (rather than being an intrinsic force exerted by objects with mass) is the result of massive objects distorting the fabric of the Universe around them



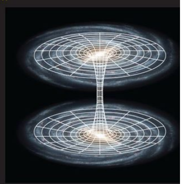
1. Any object with mass makes a 'dent' in this 'fabric' (which is known as spacetime). Any less massive object in this distorted region of spacetime will 'fall' into the dent – it isn't attracted directly by the massive object, but, because space itself is distorted, it can't help but move towards it. The greater the mass of the object, the greater the distortion is and the greater its gravitational 'pull'

2. A side effect of Einstein's new model of gravity was the black hole.
A black hole is an object that possesses so much mass that it doesn't just make a dent in spacetime, it twists it, stretches and distorts it so much that not even light (which has no mass) can move fast enough to escape. At its centre, space and time become so contorted that the laws of physics break down and time itself stops

3. A side effect of this side effect was the wormhole. Because spacetime becomes so distorted around a black hole, in theory at least, it could punch a hole through the fabric of the Universe (possibly by connecting with another black hole) – exiting in distant region of space

In science fiction, wormholes are always depicted as shortcuts through space, but this wouldn't necessarily be the case. Although the physics that describes wormholes does allow for shortcuts, there's nothing to stop the wormhole actually following a longer, meandering route

A The black hole problem

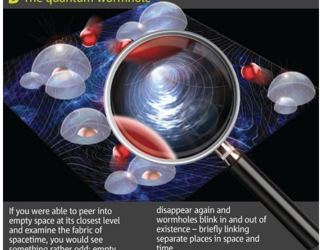


All galaxies have a supermassive black hole, with the mass of millions of Suns, at their centre. In fact, it is thought that, for a galaxy to form at all, it needs the gravitational impetus provided by its black hole.

Unfortunately, supermassive black holes don't form overnight – they start off as regular black holes and accumulate mass by gobbling up interstellar gases and stars and by merging with other black holes.

But when astronomers look back to the earliest galaxies to form just a hundred million years or so after the Big Bang, these also seem to house a supermassive black hole. How such massive black holes were able to form so quickly is a bit of a mystery.
This problem could be solved by replacing the black hole with a black hole-mimicing wormhole – a wormhole born from the quantum oddity that was the primordial Universe.

B The quantum wormhole



If you were able to peer into empty space at its closest level and examine the fabric of spacetime, you would see something rather odd: empty space is not even slightly empty. At the smallest scales, the fabric of spacetime is seething with activity. Pairs of particles pop into existence (by borrowing energy from the Universe), smash together and annihilate (returning their energy debt). Tiny black holes appear, evaporate and disappear again and wormholes blink in and out of existence – briefly linking separate places in space and time.

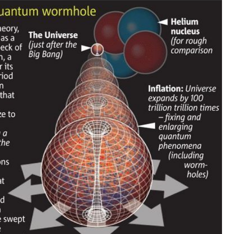
This maelstrom of quantum activity gives spacetime a foamy quality, which is why it's sometimes called the quantum foam.

The sort of wormholes that might crop up in the quantum foam are far too small and short-lived to be potential galaxy builders, but what if you could inflate them?

C Inflating the quantum wormhole

According to Big Bang theory, the Universe started life as a smaller-than-an-atom speck of matter and energy. Then, a fraction of a second after its birth, it underwent a period of exponential expansion (called cosmic inflation) that saw it inflate from its smaller-than-an-atom size to the size of a grapefruit *(equivalent to expanding a tennis ball to the size of the observable Universe).*

Any quantum fluctuations present in the smaller-than-an-atom Universe at the moment of inflation would have become fixed and enlarged along with it. A quantum wormhole swept along with it might have suddenly found itself very much larger and linking two points in space very much further apart.



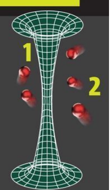
Unfortunately, the physics that makes wormholes possible also seems to rule them out as portals for travel. It describes them as being incredibly short-lived – collapsing within an instant of forming. Even if a wormhole stayed open long enough for you to consider travelling through it, as soon as anything with mass entered it, it would collapse

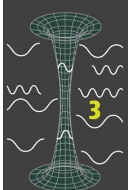
D The power of negative thinking

Instantly collapsing wormholes are a problem, but there might be a solution: negative energy. Empty space could be said to have an energy value of zero (it is empty after all), but, at quantum scales, empty space isn't empty so that value can fluctuate locally (by energy appearing and disappearing). As long the overall value is zero – no harm no foul.

1. This is a teeny tiny worm hole that has popped up in the quantum foam

2. Around it there are particles popping in and out of existence. In quantum theory, particles can be said to be waves (as well as discrete lumps of matter) and all waves have a wavelength (the distance between peaks and troughs)





3. Around the wormhole there is plenty of space for all wavelengths, but the wormhole is so narrow that only the particles with the shortest wavelengths can fit inside.
This means fewer particles can fit inside the wormhole compared to the space around it – giving it a lower energy density.
Since the energy density of the space around it must be zero, the lower energy inside the wormhole has to be negative (anything lower than zero is a negative). This process is called the 'Casimir effect'

Gravity is the result of spacetime being distorted by mass. Since mass and energy are two sides of the same coin, energy also distorts spacetime. This distortion helped form the worm-hole, but also forces its collapse. Negative mass/energy could slow, or halt the collapse – holding the wormhole open

If a quantum wormhole had been stabilised by negative energy in the primordial Universe, it's possible that a stable wormhole could have been enlarged during cosmic inflation. Such a wormhole could, in theory, take the place of a supermassive black hole when the earliest galaxies were forming

@GilliCosm on Twitter
Graphics: BEN GILLILAND