About Gravity, Part 1:

Dark Matter

Jonathan Corriveau

Email: Jonathan@JonathanCorriveau.com

Abstract

A new theory for gravity that explains Dark matter.

Gravity is a theory that is still under development. It operates on such a large scale then other known forces and we did not have enough observations to be able to make a complete theory when Sir Isaac Newton or even Albert Einstein released their theories. We know know about a phenomena that occurs everywhere in the visible universe which we refer to as “Dark Matter” which cannot be explained using either theory of gravity. My hope is to explain a still unknown fact about gravity that will uncover what dark matter really is.

About Dark matter:

Stars orbiting the center of their galaxy rotate at a normal speed when they are near the center of the galaxy but when you get further away from the center, they rotate seemingly too fast as if there was extra matter in the galaxy that creates extra gravity. Nobody knew what caused this ‘extra gravity’ so it was speculated that there was some kind of invisible dark matter and that it was much more abundant then normal matter.

The strange fact about Dark matter is that is has never been observed even after decades of trying to detect it. Also, even if it is speculated that dark matter is more abundant then visible matter, we don’t even see a single planet or star that seem to have it’s orbit changed because of it. When we look at anything at small scale, we cannot detect it but when we look at a whole galaxy it is easy to see it’s effects on every star that is far from the center of their galaxy.

Why don't we see planets or stars orbiting dark matter? Why are there asteroids with orbits of hundreds of years that do not seem to have their orbit affected by dark matter ? Obviously, if dark matter is more common then normal matter then we should detect some in our solar system. We are able to detect very small changes in gravity with our detection instruments, even detecting the change in gravity caused by snow on the roof of a building but we never detected a mass of dark matter that would pass thru our planet. The fact that dark matter is never detected in a small scale but so reliably detected when looking at the rotation of stars in galaxies isn’t proof but it’s evidence that instead of looking for hidden matter, we should double-check our theory of gravity.

The new gravity theory :

We all know that gravity can bend the path of normal matter. Any matter passing in a straight line near our galaxy would curve towards it. We also know that gravity will curve energy passing by in the form of electromagnetic waves. Light would also have it's path curved while passing near our galaxy. Everything we know about can be curved: matter and energy. Even magnetic forces have curved lines.

In that case, is it so far-fetched to imagine that gravitational waves can be bent too? Just like we can observe gravitational lensing when looking at a distant galaxy, could we observe gravitational lensing of gravitational waves?

This is the foundation of this curving gravity theory: Gravitational waves can be curved by gravity itself. Picture yourself far from the milky way and imagine you are able to see gravitational waves leaving the supermassive black hole at it's center. If gravity itself can be curved, then you would see lines leaving the black hole in every direction but gravitational waves leaving at a small angle above or below the galactic disc would be curved back into the galactic disc. For stars near the center of the galaxy this would have no effect, however for solar systems far enough from the center of the galaxy it would seem as if the supermassive black hole is more massive because they would receive more gravitational waves from the center of the galaxy. All the stars between a solar system and the galactic center would create gravitational lensing of gravitational waves so if you are far enough on the galactic disk, you get more gravity then you could have expected using previous gravity theory. This is something we expect if gravity can be curved. This is something that was already observed and we called it "dark matter" when we didn't know that gravity could be curved. Dark matter is not needed anymore to explain the rotation of distant stars in a galaxy and this theory does not affect gravity at short distances.

If we looked at a galaxy that has a low density of stars, especially if the low density is near it's supermassive black hole, then we would expect gravitational waves to be much less curved. Such a galaxy would appear to have no or very little dark matter, all the stars would rotate at a speed that would appear normal to Newton. The appearance of dark matter can therefore give us a hint on the density of a galaxy, especially near the it's center.

Fermi Bubbles :

If the gravity lines from our supermassive black hole are curved, it means that there are areas in our galaxy where there is more gravity and there are other areas where there is less gravity. The disc itself receives the highest concentration of gravitational waves. The area just above and below the disc will receive less gravity. Areas above and below the center of the galaxy near Sagittarius A will get a fair amount of gravity since these gravitational waves will not be bent back into the galactic disc. If we look at an image of our milky way that includes the Fermi bubbles, the areas where these bubbles are located (where matter is detected) are the areas which are getting a fair amount of gravity, and the empty areas are getting less gravity. There is a theory that states that the matter in the Fermi bubbles was actually ejected from our supermassive black hole and I cannot deny it. However, this theory of gravity states that the galactic disk receives a large part of gravitational waves and the Fermi bubbles should get more gravitational waves then the empty regions surrounding our galaxy. Therefore it should be expected that more matter falls into our galaxy from the region of space known as the Fermi bubbles.