3 Ways for Him to Swing
sgm, 2018/DEC/07

There are ***only three*** possibilities about how the presence of antimatter ***affects time*** and therefore – ***how gravitation works with antimatter***:

1. antimatter affects time ***exactly how*** matter does
   if that's true, time ***slows down*** near concentrations of antimatter just like matter; antimatter black holes and neutron stars should behave ***exactly like*** matter black holes and neutron stars; we should see matter and antimatter ***merging everywhere*** – exploding and annihilating each other ***everywhere*** in the universe – ***WE DON'T***

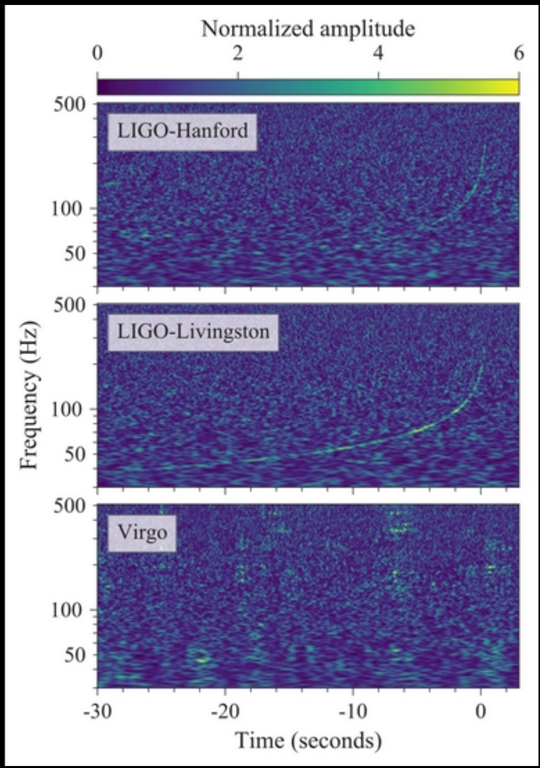
2. antimatter affects time ***exactly opposite how*** matter does
   if that's true, time is ***reversed*** near concentrations of antimatter opposite of matter; antimatter black holes and neutron stars should evolve ***backwards*** in time; we should see antimatter stars ***getting younger*** everywhere in the universe; we should see antimatter supernova ***imploding*** and ***becoming younger*** stars – ***WE DON'T***

3. antimatter ***compresses time opposite how*** matter dilates time
   time ***speeds up*** at least by a factor of 3 near antimatter stars which means ***most if not all antimatter stars are dead***; there's ***only three*** ways for a star to die:
   1. nova – white dwarf
   2. supernova – neutron star
   3. supernova – black hole

   in case 3, the event horizon is where ***time goes to infinity***; ***antimatter black holes should evaporate 'instantly' / fairly quickly*** – these would be excellent candidates for GRBs, gamma ray bursters;
   in cases 2 & 1, there still should be tremendous amounts of antimatter cool white dwarfs and old antineutron stars permeating the cosmos; these would ***individually not interact one-on-one*** with matter neutron stars etc HOWEVER, ***collectively could force*** matter into filaments, dark flow, and even increase the expansion rate of the

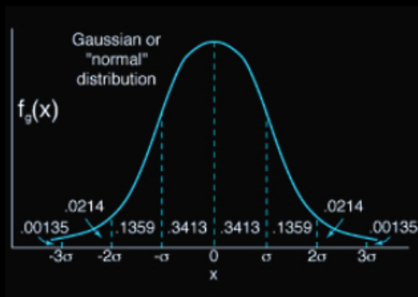
universe

https://en.wikipedia.org/wiki/GW170817
is the Wikipedia link for “GW170817 was a gravitational wave (GW) signal observed by the LIGO and Virgo detectors on 17 August 2017.”



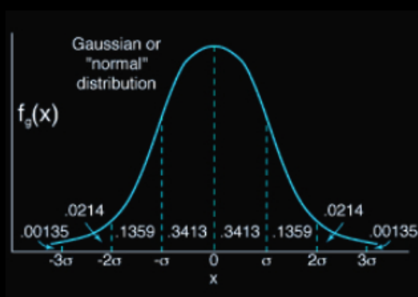
which is the *first neutron star merger* GW detected to date. The relevancy to above? The proportion of neutron star mergers that end in black holes, *matter black holes*, should behave a *certain way* according to our conventional ideas regarding such. If Case 3 is correct above, ***ALL*** antimatter neutron star mergers that result in black holes should rapidly evaporate and produce GRBs. Conceivably, the new LISA gravitational wave detector to be launched in 2034, should be able to detect *any differences* in antineutron star *merger signatures* – as compared to *matter* neutron star *merger signatures*. Remember, if Case 3 is correct, ***time itself*** passes *three times more rapidly* near antineutron stars – as compared to near matter neutron stars; antineutron star mergers *themselves* should ***transpire much more quickly*** than matter neutron star mergers.

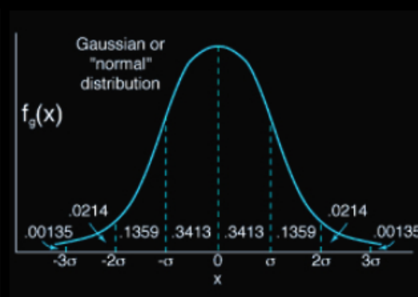
2D depiction of a 3D *time-dilation field* of a neutron star:



peak magnitude is 1.7, $\sigma=2r_s$, r_s=Schwarzschild-radius

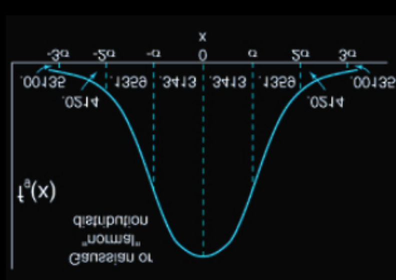
time-dilation view of ‘gravitational’ force:



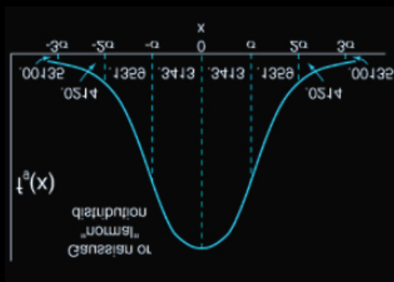


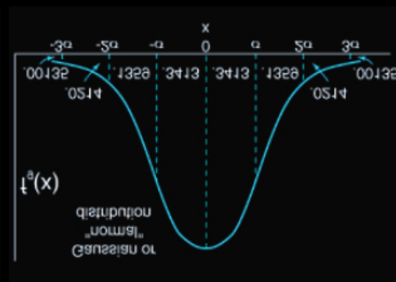
two neutron stars are attracted to each other ‘gravitationally’ because *time is dilated between them*

2D depiction of a 3D time-*compression* field of an *anti-*neutron star:



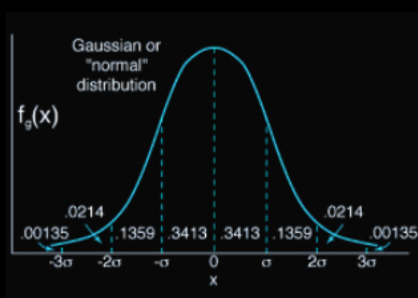
peak magnitude is -1.7, $\sigma=2r_s$, r_s=Schwarzschild-radius time-compression view of ‘gravitational’ force:

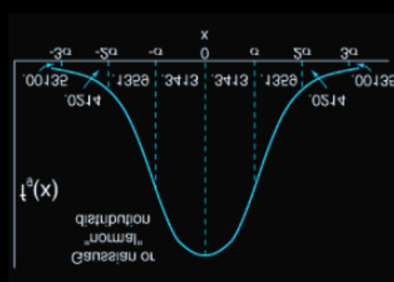




two antineutron stars are *attracted* to each other ‘gravitationally’ because *time is compressed between them*

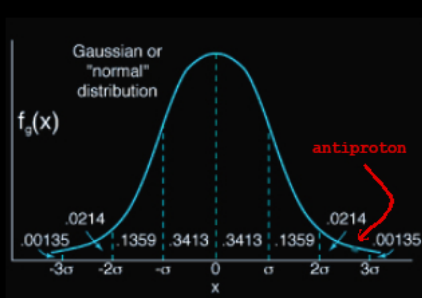
No ‘gravitational’ interaction between a neutron star and antineutron star because *time is flat between them*:





^
|
flat time

An antiproton near a neutron star:



appears as a ‘dip’ in the time-dilation field of a neutron star; effectively, *gravitational repulsion*

A proton near an antineutron star would experience a similar phenomenon.

The argument on page 1 of this essay is based on the assumption that time-dilation is coupled with matter inextricably: that some form of dilation / compression is also associated with antimatter and that Case 2 antimatter stars are actually observable by us.

At first glance, matter-antimatter neutron star interactions may appear to be valid only if masses are equal, however, after careful examination of thought-experiments with a preponderance either way, there is still flat-time between them which implies *no gravitational interaction whatsoever regardless* of mass inequity. This actually is a kind of scary thought: rogue antineutron stars could wander care-free throughout the cosmos and our own Milky Way galaxy wreaking havoc as they physically graze, albeit rare, other planetary/stellar bodies. The ‘only’ safety factor would be a general cosmic migration of them toward a center-of-mass with respect to antimatter in our universe. At first, I considered only galactic Lagrange points to be safe-havens for antineutron stars, and now as I reconsider, the black hole at the center of our Milky Way could actually act as our own personal galactic-policeman by creating a dilation field that should repulse antineutron stars as neutron stars repulse antiprotons. Whew! Safe again! [wink]

It took me *years* to arrive at the point to be able to view gravitation as time-dilation between massive bodies and *only recently* came to be aware of the no-interaction phenomenon between neutron and antineutron stars. At the same time, I became aware of gravitational *attraction* between antineutron stars – and – the gravitational *repulsion* between hugely-different types.

Finally, the auto-death of antimatter black holes is both reassuring and sad: reassuring that antimatter *cannot* dominate; sad that we’ll never see one.