Preceding: Atomic internal gravitational waves and shock waves: Electromagnetic charge cannot hold a positron near a proton both with positive charges, but the gravitational waves make it possible

PiMANN Getsemi
(ORCiD: 0000-0003-0579-8966)
*Contact the author to participate for the next edition

June 2, 2018

Mostly, the destructive force of internal (atomic) wave-particles that we call microscopic shock waves emitted by the nuclei at most, and lastly the external (galactic gravitonic, and photonic) wave-particles towards the nuclei, is affectionate to make them unstable. A higher rate of energy that would increase the internal energy of atoms and so increases the energy of these sub-atomic particles, and also what we call higher entropy (higher energy dispersal), both cause the powerful microscopic shock waves, coming from sub atomic wave-particles. **Shock waves are not much strong for atomic objects, or celestial objects to get measured, meanwhile their destructive power potentially can destroy the nearby smaller and weakly confined objects. However in the Earth's atmosphere, ultrasonic jets makes strong shock waves as they are flying in the sky, another example is when a car moves inside the street and triggers alarms of the other cars that are parked in the sides of the street. Additionally, an example for the effectiveness of shock waves is when a strong storm or a powerful quake causes a tsunami.**

However note that in space-time of our own universe many of the sub-atomic particles are getting considered as massless particles, which means for those microscopic shock-waves coming from the sub-atomic particles that made up the nuclei (quarks, bosons, etc.) we cannot measure the effective power of such microscopic shock-waves. **However, the force binding the nucleus is not the electromagnetic force that holds electrons in their orbits, but is a short-range force whose magnitude is independent of the type of nucleon, proton or neutron, if the electron orbital ties to the nucleus**

*Email address: peiman.ghasemi@aol.com

was only due to the electromagnetic force, and not also however the gravitational waves, therefore since the nucleus just contains positive charge (neutrons are charge-less particles), the positrons (anti-electrons) with positive charge could not being held at the atom.

Albert Einstein originally predicted the existence of gravitational waves in 1916, on the basis of his theory of general relativity. General relativity interprets gravity as a consequence of distortions in space-time, caused by mass. Therefore, Einstein also predicted that events in the cosmos would cause "ripples" in space-time – distortions of space-time itself – which would spread outward, although they would be so minuscule that they would be nearly impossible to detect by any technology foreseen at that time. It was also predicted that objects moving in an orbit would lose energy for this reason (a consequence of the law of conservation of energy), as some energy would be given off as gravitational waves, although this would be insignificantly small in all but the most extreme cases.

One case where gravitational waves would be strongest is during the final moments of the merger of two compact objects such as neutron stars or black holes. Such powerful macroscopic (opposed to microscopic) stellar effects was observed in 2015, and was announced by the LIGO and Virgo collaborations the next year. Previously gravitational waves had only been inferred indirectly, via their effect on the timing of pulsars in binary star systems.

As an example, let us consider the merger of two black holes. Long before the merger, the total energy of the two-black-hole spacetime, the so-called ADM energy or "mass," named for its creators Arnowitt-Deser-Misner, is essentially the sum of the masses of the individual black holes. During the merger, energy and momentum are radiated away in the form of gravitational waves. After the merger, once the waves have propagated away from the system, the energy left in the system, the so-called Bondi mass, decreases and this can be calculated through the formalism introduced by Bondi, Sachs, and Trautman. Gravitational radiation travels along null hypersurfaces in the spacetime. As the source is very far away from us, we can think of these waves as reaching us (the experiment) at null infinity, which is defined as follows. Future null infinity $\mathcal{I}^+$ is defined to be the endpoints of all future-directed null geodesics along which $r \to \infty$. It has the topology of $\mathbb{R} \times \mathbb{S}^2$ with the function u taking values in $\mathbb{R}$. A null hypersurface $\mathcal{C}u$ intersects $\mathcal{I}^+$ at innity in a 2-sphere. To each $\mathcal{C}u$ at null innity is assigned a Trautman-Bondi mass $M(u)$, as introduced by Bondi, Trautman, and Sachs in the middle of the last century. This quantity measures the amount of mass that remains in an isolated gravitational system at a given retarded time, i.e. the Trautman-Bondi mass measures the remaining mass after radiation through $\mathcal{I}^+$ up to u. The Bondi mass-loss formula reads for $u_1 \leq u_2$.

$$M(u_2) = M(u_1) - C \int_{u_1}^{u_2} \int_{S^2} \mid \Xi \mid^2 d\mu_\gamma \circ du$$

with $\mid \Xi \mid^2$ being the norm of the shear tensor at $\mathcal{I}^+$ and d the canonical measure on S^2. If other elds are present, like electromagnetic elds, then the formula contains a corresponding term for that field. In the situations considered here, it has been proven that $\lim_{u\to-\infty} M(u) = M_{ADM}$. The last equation above is just in regard with the general relativity and yet is not acceptable for quantum space-time and special relativity.