Messier 87 - Virgo A Super Giant Elliptical Galaxy

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Messier 87 - Virgo A

Supergiant Elliptical Galaxy [1]

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Abstract:
The massive M87 galaxy provides a unique opportunity to study the operation of a large Black Hole at its centre. Our satellite and land-based telescopes completed a detailed analysis of the structure, which revealed an image of the BH as well as clear signs of a large jet of sub atomic particles emerging from its centre. We conclude there can be little doubt that BHs exist, and they represent one of the most interesting and poorly understood parts of cosmology. BHs provide a possible explanation for a source of gravity, and the emission of cosmic rays from BHs provides a partial explanation for the continuous recirculation of universe mass.

Keywords:
Messier 87, Virgo A, NGC 4486, M87, Black Hole, Hubble, Chandra, EHT, VLBI, Kruskal-Szekeres, KS diagram, positrons, Coulomb's Law

1) Introduction:

"Messier 87 (also known as Virgo A or NGC 4486, generally abbreviated to M87) is a supergiant elliptical galaxy in the constellation Virgo. One of the most massive galaxies in the local universe."[2]

M87 recently received notoriety due to the imaging of a Black Hole (BH) in the centre of this galaxy. The image result took years to obtain and involved the orbiting Hubble and Chandra Telescopes,[3] as well as earth based Event Horizon Telescope (EHT) array formed into Very Long Baseline Interferometry, or VLBI.[4]

Figure 1. Chandra BH Image, included the footnote comment
"*Chandra X-ray Close-up of the Core of M87, EHT Image of Black Hole*
Credit, X-ray: NASA/CXC/Villanova University/J. Neilsen, Radio: Event Horizon Telescope Collaboration" and
"*Surrounding the elliptical galaxy is a reservoir of multimillion-degree gas, which glows brightly in X-ray light. Chandra's studies of this hot gas have given astronomers insight into the behaviour and properties of the giant black hole. For example, astronomers have used Chandra data to discover ripples in the hot gas, which provide evidence for repeated outbursts from the black hole roughly every 6 million years or so.*"

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[1] http://www.bosmin.com/PSL/M87Galaxy.pdf

[2] https://en.wikipedia.org/wiki/Messier_87

[3] https://chandra.si.edu/blog/node/719

[4] https://www.jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/

Controversy surrounding Figure 1, which concentrated on the EHT component of the image, was reported by Pierre-Marie Robitaille, Ph.D at "The Black Hole Image – Data Fabrication Masterclass!"[1] This video presentation focuses on the great difficulty/impossibility of obtaining the EHT "image" from such a distant object.

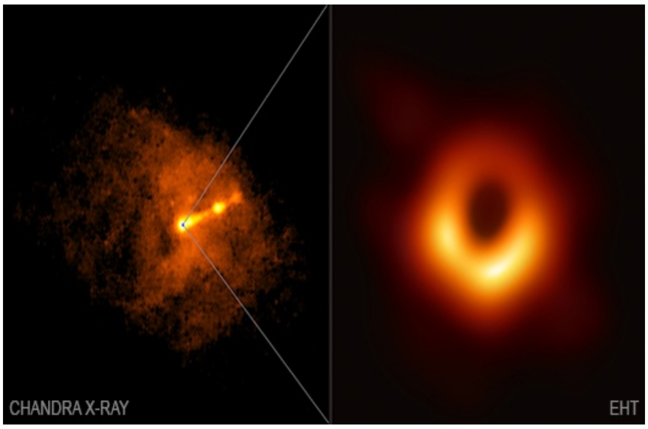

Figure 1. Chandra BH Image

However, the Chandra X-Ray component of Figure 1, clearly shows a radiating finger pointing to the star centre of the picture. The "finger" is further detailed in Figure 2. Hubble BH Image.[2] This image includes the comment.

Figure 2. Hubble BH Image

"Streaming out from the center of M87 like a cosmic searchlight is one of nature's most amazing phenomena: a black-hole-powered jet of subatomic particles travelling at nearly the speed of light. In this Hubble image, the blue jet contrasts with the yellow glow from the combined light of billions of unresolved stars and the point-like clusters of stars that make up this galaxy.
Credits: NASA and the Hubble Heritage Team (STScI/AURA)"

[1] https://principia-scientific.org/the-black-hole-image-data-fabrication-masterclass/

[2] https://www.nasa.gov/feature/goddard/2017/messier-87

2) The Black Hole Jet:

The ‘jet’ is described as “*subatomic particles travelling at nearly the speed of light*” raises the questions:

- What causes this stream?
- How do sub atomic particles leave a BH, which is reported as being too gravitationally intense for even light to escape as defined by the Schwarzschild Radius BH theory?

3) At The Black Hole:

The Inverse-square law becomes critical, as material approaches a BH. This situation is described mathematically as intensity being inversely proportional to distance squared:

$$\text{intensity} \propto \frac{1}{\text{distance}^2}$$

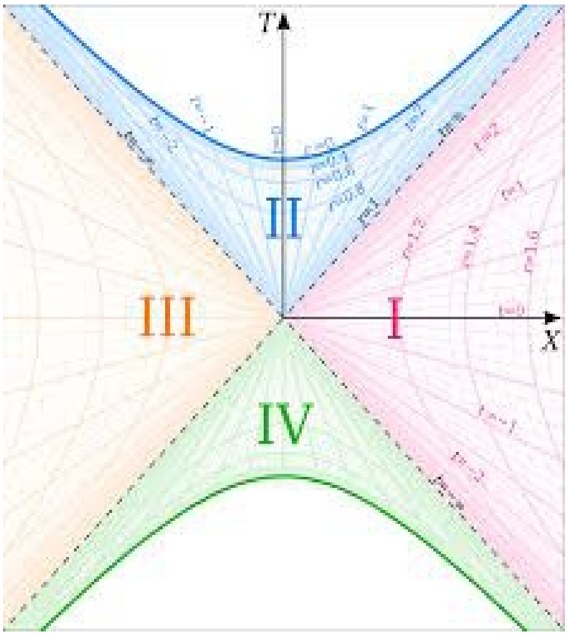

Figure 3. Kruskal-Szekeres Diagram

At a BH, the distance factor approaches zero, which provides a mathematical limit to this expression, because dividing anything by zero produces an indeterminate solution.

This problem was addressed and is now described in Figure 3. Kruskal-Szekeres Diagram. (KS Diagram)

“*In general relativity Kruskal–Szekeres coordinates, named after Martin Kruskal and George Szekeres, are a coordinate system for the Schwarzschild geometry for a black hole.*”[[1]]

[1] https://en.wikipedia.org/wiki/Kruskal%E2%80%93Szekeres_coordinates

4) Physical Interpretation of KS Diagram:

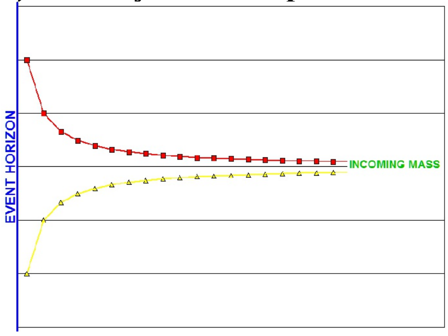

Figure 4. Mass at Near Zero Distance.

The KS Diagram illustrates the mathematical options available for entering a BH. If we use a 2D diagram to explain this action, it appears as shown in Figure 4. Mass at Near Zero Distance. Here incoming mass approaches the event horizon at a BH, and forms into two asymptotic curves which can approach either the positive or negative vertical axis.

As the mass passes closer and closer to the vertical axis, the outer most elements of mass encounter the event horizon and are removed.

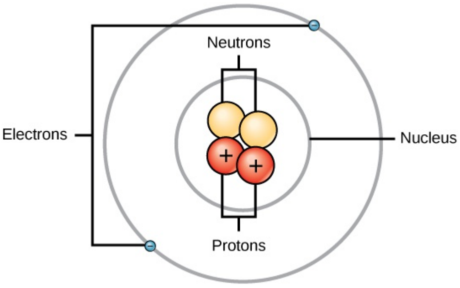

Figure 5. Atomic Illustration

This happens at the atomic level. The outer most elements are electrons as schematically illustrated in Figure 5. Atomic Illustration,[1] with protons and neutrons assembled at the nucleus.

[1] https://wou.edu/chemistry/files/2017/04/atomic-structure-1.png

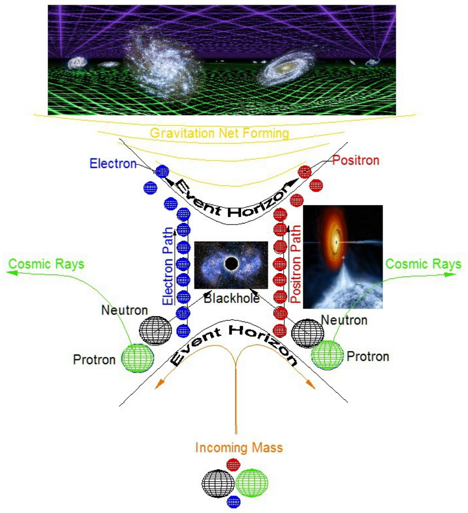

Figure 6. Black Hole Section.

Our composite interpretation of the KS Diagram shows in Figure 6. Black Hole Section. Refer

GRAVISPHERES *What' the matter with Dark Matter?*[1] Here, electrons are separated between positrons and electrons as they pass across the BH surface.

Positrons remain at the surface of the BH, where they provide a stabilising charge for the internal neutrons, which otherwise have a half life of minutes. "*The neutron is a baryon and is considered to be composed of two down quarks and one up quark. A free neutron will decay with a half-life of about 10.3 minutes.*"[2]

The Gravisphere theory proposes electrons emerging from the BH, form an entangled relationship with the remaining positrons, before travelling through space as Electromagnetic Gravity Strings (EGS/egs).[3]

The incoming mass is further consumed when the protons and neutrons reach the Event Horizon, with the neutrons remaining at the BH, thereby increasing the mass of the structure.

Protons temporarily enter the BH, but are soon ejected, because the positive charge influence of the surrounding positrons, provide a repulsion force which ejects proton-rich cosmic rays along the BH axis.

The M87 library of information which includes the Hubble cosmic ray image described as "*This Hubble Space Telescope photograph shows the jet of matter ejected from M87 at nearly the speed of light, as it stretches 1.5 kpc (5 kly) from the galactic core.*"

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[1] https://principia-scientific.org/publications/PROM/PROM-Beatty-Gravispheres.pdf

[2] http://hyperphysics.phy-astr.gsu.edu/hbase/Particles/proton.html

[3] http://www.bosmin.com/PSL/InterstellarGravity.pdf

5) Cosmic Ray Ejection Speed:

The positrons and protons have equal positive charges calculated to be 1.602E-019 Coulombs, and the mass of a proton is $1.6726219 \times 10^{-27}$ kg. Coulomb's Law calculates the force between two quantities of charge using the formula:

$$F = k_e \frac{q_1 q_2}{r^2}$$

Where q_1 and q_2 are the charges in Coulombs, r is the distance between the charges, and k_e is Coulomb's constant where $k_e \approx 9 \times 10^9\ N{\cdot}m^2{\cdot}C^{-2}$

It is assumed that the discharge of protons from the BH operates similar to a rail gun where electromagnetic charges are progressively introduced along the barrel length, thereby accelerating the charge until it exits the gun.

The chosen discharge distance at a BH is 100km and the distance between the charges is 0.5 metres, which provides the force (F) operating on the proton mass.

Acceleration comes from Newton's second law of motion F=ma, and the terminal velocity is calculated from $V = (2aS)^{0.5}$

The summary tabulation appears in Figure 7. Cosmic Ray Velocity.

Input				
	Speed of Light		mps	2.998E+008
	Number of Positrons		###	700,000
	Postiron Charge		C	1.602E-019
	Positiron to Proton Ratio		###	1,000
	Proton Charge		C	1.602E-019
	Proton Mass		kg	1.673E-027
	Distance between charges		m	0.5
	Electric Field Constant	k=9*10^9*N*m^2/C^2	N	9.00E+009
	Proton Acceleration Path Distance		m	100,000
Output				
	Positron Repulsion Charge		Q1	1.121E-013
	Proton Repulsion Charge		Q2	1.12E-010
	Coulomb's Law	Fe=k(Q1xQ2)/d^2	N	4.53E-013
	Acceleration of Proton	a = F/m	a	3.87E+011
	Proton Acceleration distance		S	1.00E+005
	Proton Velocity	V = (2aS)^0.5	mps	2.78E+008
	Comparison with speed of light		%	93%

Figure 7. Cosmic Ray Velocity

A mass of 700 protons is ejected at a velocity, 93% of the speed of light. Cosmic ray emissions are spasmodic and depend on the volume of incoming mass.

6) Black Hole Appearance:

Figure 8. Black Hole Surface Comparison

Figure 6 illustrates a young BH arrangement which can be compared to an apple with a single core axis.

However, as a BH ages it emits proton charges, but builds up and retains positrons on its surface. This effectively establishes a permanent and growing positive charge on the skin of the BH which then changes from a smooth apple surface to a wrinkled custard apple surface shape. The comparison is shown in Figure 8. Black Hole Surface Comparison.

Raymond Gallucci raises queries in his paper "Neutron' vs. 'Strobe' Stars?"[1] including:
• "*How rapidly the star has to be rotating to produce these flashes in millisecond time*"
• "*That the earth, where we do all our observing from, must be exactly in the beam's plane of rotation.*"

A crenellated neutron star skin means that cosmic rays can emerge from points all over its surface. I suspect the neutron star has a crenellated positive surface charge providing many points of exit for the cosmic rays, which are otherwise interpreted as coming from the one axial emission source. This also explains why we on Earth always seem to be in the right position to see an "axial" view of a neutron star.

It seems possible the increasing positive charge on the surface of a BH will eventually cause the surface to explode off in all directions. This could explain some observed stellar tectonic events, such as those referred to in the Introduction.

7) Conclusions:

1. There can be little doubt that BHs exist, and represent one of the most interesting and poorly understood part of cosmology.
2. BHs provide a possible explanation for the source of gravity.
3. Emission of cosmic rays from BHs provides a partial explanation to support the continuous universe theory.

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[1] http://vixra.org/abs/1703.0209