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The cosmic gorilla effect or the problem of undetected non terrestrial intelligent signals

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ABSTRACT

This article points to a long lasting problem in space research and cosmology, the problem of undetected signs of non terrestrial life and civilizations. We intentionally avoid the term extraterrestrial as we consider other possibilities that may arise but not fall strictly within the extraterrestrial scope. We discuss the role of new physics including dark matter and string theory in the search for life and other non terrestrial intelligence. A new classification for non terrestrial civilizations with three types and five dimensions is also provided. We also explain how our own neurophysiology, psychology and consciousness can play a major role in this search of non terrestrial civilizations task and how they have been neglected up to this date. To test this, 137 adults were evaluated using the cognitive reflection test, an attention/awareness questionnaire and a visuospatial searching task with aerial view images to determine the presence of inattentional blindness.

1. Introduction

The size of one thumb held at arm's length is small but covers the Coma cluster in the night sky. The Coma cluster consists of approximately 1000 galaxies spreading over two degrees on the sky or the thumb's field. The first quantitative case for dark matter in the Coma galaxy cluster was made in 1933 by the Swiss astronomer Fritz Zwicky at the California Institute of Technology [1]. Since then, our understanding of the total amount of dark matter and its overall distribution has increased. Dark matter constitutes 85% of the matter in the universe, the rest is made up of baryonic matter (i.e., ordinary matter, including protons and neutrons) [2]. In addition to dark and baryonic matter, which combined make up 32% of the known universe and produce gravitational attraction, the remaining 68% of the universe, referred to as dark energy, appears to oppose gravitational attraction and, in fact, seems to be accelerating the expansion of the universe.

Current research in physics proposes various candidates for dark matter, ranging from the so-called weakly interacting massive particles (WIMPs) to polarization of the quantum vacuum [3]. WIMPs are thought to have masses around the electroweak scale and are weakly interacting with baryonic matter with lifetimes comparable or larger than the age of our universe. Their existence is predicted by several models in particle physics, such as supersymmetry and models with universal or warped extra dimensions; however, there is no conclusive direct evidence for their existence yet [2].

Dark matter has not attracted much attention in search for extraterrestrial intelligence (SETI) research to this date. Currently, most efforts to find extraterrestrial intelligence are carried out by SETI using the radio signal detection approach but with no success so far. In a recent representative effort, The Breakthrough Listen Initiative [4] searched for engineered signals with observations made over 1.1–1.9 GHz (L band) from a sample of 692 nearby stars using the Robert C. Byrd Green Bank Telescope with negative result. More recently, active SETI approach has been brought forward consisting in sending signals instead of the passive detection approach. Both focus the research on the radio hypotheses and methods of contact. Latest SETI efforts, known as the near-infrared optical search for extraterrestrial intelligence [5], are focusing on the infrared band of the spectrum; however, as we mentioned before, silence persists.

Other hypotheses or methods have been proposed in the last years, including Dyson spheres detection, Bracewell probes possibility, and, more recently, the Planck energy and cosmic engineers hypotheses [6]. All these hypotheses except the last one, to an extent, have something in common in the physics of directly observable universe or known universe. Radio and optical telescopes use focusing optics searching for artificial signals within the field of view of the primary targets, hoping that extraterrestrial intelligence (ETI) happen to lie in those directions [6–8]. In today's radio telescope communication approach used by SETI,

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for example, the rate of information transmission produced by specific transmitter and under specific noise distribution is determined by the corresponding Shannon–Hartley theorem:

$$C = B^* \log_2(1 + S/n),$$

Where C is the achievable channel capacity, B is the bandwidth, S is the average signal power, and n the average noise power.

There are currently two common arguments against the existence of ETI. The evolutionary argument goes back to Alfred Wallace, with Darwin, the codiscoverer of the principle of natural selection. The second is the Fermi paradox of Enrico Fermi. Theoretical approaches in the search for life in the universe have been based on the study of the physical conditions necessary for the appearance and evolution of life to the point of intelligent civilizations. In this direction, physical laws determine the possibilities. Physics has progressed enough during these years to revise and maybe repostulate some paradigms in the search for life in the universe and even in the search of other intelligence in the universe. First, the mere conceptualization of extraterrestrials as a life form coming from the distant parts of our known universe may be inherently wrong and contains anthropomorphic considerations that we need to overcome. Second, dismissing our own neurobiology, psychology, and consciousness factors puts us in the same wrong direction. During the last years, we have seen a great progress in the understanding of the structure of our universe. We now have evidence that the majority of the matter that forms galaxies, clusters of galaxies, and the largest observed structures in the universe is nonluminous, or dark. Accurate measurements of the galactic rotation curves and orbital velocities of individual galaxies, determinations of the cluster mass via gravitational lensing, and precise measurements of the cosmic microwave background fluctuations all support this hypothesis. Search for WIMPs is now underway; however, terrestrial direct detection experiments, designed to detect nuclear recoils from collisions with dark matter particles in the galactic halo, provide likely our best hope to detect dark matter [9]. The indirect dark matter detection focuses on rare components in charged cosmic rays (CRs) [10] as well as in gamma rays, and, more generally, in multiwavelength photons [11–13]. For the investigation of these annihilation products, ground-based telescopes, balloon-borne detectors, and space-based experiments are being used. The charged CRs eventually reach the Earth after diffusing in the galactic magnetic fields [10]. The prospects of exploring the electroweak scale in the Large Hadron Collider (LHC) have focused the dark matter searches on the WIMP paradigm in the last few years, and the experimental community has devoted relatively little effort to explore other possibilities. As with SETI search for radio signals from extraterrestrial civilizations, the LHC direct searches for WIMP dark matter has no success to this date. A number of small-scale experiments at the low-energy, high-intensity frontier, such as haloscopes, helioscopes, and light-shining-through-a-wall experiments, are actively searching for these elusive particles [13], complementing searches for physics beyond the standard model at the high-energy frontier.

Some researchers have theorized that communication from ETI may show up in the form of communication from another dimension of space [14]. This would allow ETI to eliminate the problems with radio signal power loss and attenuation across vast distances of our three spatial dimensions. Modern M-theory and string theories have included up to 11 dimensions of space, which might allow for this communication to occur. In fact, gravity might be weak because it propagates from other dimensions of space to ours.

On the one hand, we have the SETI approach; on the other hand, we have the new physics endeavor of searching for new particles and dark matter. What if these two scientific research fields were related beyond our current hypotheses or focus in the topic? What if human factors or biopsychological aspects are biasing this scientific task?

Dan Simons and Christopher Chabris [15] popularized a phenomenon of human perception known as "inattentional blindness". In the best known version of the experiment, volunteers were told to keep track of how many times some basketball players tossed a basketball. While they did this, someone in a gorilla suit walked across the basketball court, in plain view, yet many of the volunteers failed even to notice the gorilla (Fig. 1). The invisible gorilla experiment shows that if we are paying very close attention to one thing, we often miss other things in our field of vision, even those very obvious. Many current scientific tasks still depend on human intervention, for example remote sensing image analysis where it is inevitable, even crucial [16].

We are going to expose in this paper some new research hypotheses that the SETI research should contemplate in light of the new twenty-first century physics and cognitive psychology.

Fig. 1. Inattentional blindness experiment.
Image credit: Dr. D.J. Simons [15].