

AWE OF DISPLACEMENT “RECENTERING” HUMANS IN A POST-QUANTUM ERA

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ABSTRACT: This paper explores the evolving conceptualization of humanity’s place in the cosmos, tracing a trajectory from anthropocentric narratives rooted in religion and classical science to the decentering revelations of modern science, and finally toward a nuanced “recentering” influenced by quantum mechanics. Challenging the notion that language or consciousness alone marks human uniqueness, the paper highlights evolutionary evidence — such as changes in the sphenoid bone — that reveal our symbolic capacities as contingent rather than exceptional. The “awe of displacement,” catalyzed by discoveries in cosmology, biology, and anthropology, reflects a cultural and cognitive dislocation from humanity’s once-assumed centrality. Yet, the paper argues, recent developments in quantum theory introduce a paradigm shift. By positioning the observer as integral to the manifestation of physical reality, quantum mechanics complicates traditional dichotomies between subject and object, nature and culture. Human perception, cognition, and language are not passive tools of observation, but active participants in shaping reality itself. This reconfiguration does not return us to anthropocentrism, but instead suggests a dynamic centrality based on entanglement, interaction, and participation. From this perspective, the age of the so called “Anthropocene” brings about new meanings: humanity’s centrality manifests not through dominance, but responsibility. Finally, the paper engages with contemporary expressions of human exceptionalism in biotechnology and space exploration, critically examining their ethical and existential implications. In conclusion, the paper proposes that displacement and recentralization are not opposing movements, but interwoven dynamics shaping a new understanding of human identity — one grounded in humility, interconnectedness, and the participatory nature of knowledge itself.

Il presente saggio esplora l’evoluzione della concettualizzazione della posizione dell’umanità nel cosmo, tracciando una traiettoria che va dai racconti antropocentrici, radicati nella religione e nella scienza classica, alle rivelazioni decentranti della scienza moderna, fino a giungere a una forma sfumata di “ricentramento”

influenzata dalla meccanica quantistica. Mettendo in discussione l'idea che la lingua o la coscienza costituiscano in sé il segno distintivo dell'unicità umana, il saggio evidenzia dati evolutivi — come le trasformazioni dell'osso sfenoide — che mostrano come le nostre capacità simboliche siano frutto di contingenze piuttosto che di un'eccezionalità innata. L'"aura dello spossamento", innescata dalle scoperte in cosmologia, biologia e antropologia, riflette un dislocamento culturale e cognitivo rispetto alla centralità un tempo presunta dell'essere umano. Tuttavia, il saggio sostiene che gli sviluppi recenti della teoria quantistica introducano un cambiamento di paradigma. Collocando l'osservatore come elemento costitutivo nella manifestazione della realtà fisica, la meccanica quantistica complica le dicotomie tradizionali tra soggetto e oggetto, natura e cultura. La percezione, la cognizione e il linguaggio umani non sono strumenti passivi di osservazione, ma partecipano attivamente alla configurazione della realtà stessa. Questa riconfigurazione non comporta un ritorno all'antropocentrismo, ma suggerisce piuttosto una centralità dinamica, fondata sull'intreccio, sull'interazione e sulla partecipazione. Da tale prospettiva, l'epoca del cosiddetto "Antropocene" acquista nuovi significati: la centralità dell'umanità non si manifesta nel dominio, bensì nella responsabilità. Infine, il saggio affronta le espressioni contemporanee dell'eccezionalismo umano nella biotecnologia e nell'esplorazione spaziale, esaminandone criticamente le implicazioni etiche ed esistenziali. In conclusione, si propone che spossamento e ricentrimento non vadano intesi come movimenti opposti, bensì come dinamiche intrecciate, capaci di forgiare una nuova comprensione dell'identità umana, fondata sull'umiltà, sull'interconnessione e sulla natura partecipativa della conoscenza stessa.

KEYWORDS: Decentralization; Humans; Displacement; Post-quantum Era; Recentralization

PAROLE CHIAVE: Decentralizzazione, Umani, Dislocamento, Era post-quantum, Ri-centralizzazione

1. In the beginning was the sphenoid bone

In the beginning was the Word. Or at least, this is how the story is told. In ancient Greek, "the Word" is the translation of "ὁ λόγος" (*Logos*), which also means reason, wisdom, or knowledge. In a sense, the beginning of our existence as humans is summarized through this enunciation, by our ability to speak, to reason, to articulate thoughts.

Being the only mammals able to have proper language systems and express abstract ideas, we related "the word" with the beginning of

humanity, as if this specific connection had the main function to endorse our species as the special, unique, hierarchically superior one out of all.

Until we discovered the truth.

It has become increasingly clear, thanks to recent paleoanthropological research (Zilhao *et al.* 2024), that before verbs and language could emerge among our species, other major evolutionary events took place. Genetic changes within our bodies, particularly in our skeletal structure, played a crucial role in making us able to speak. A key transformation in the sphenoid bone — which underlies the base of the skull — led to important anatomical shifts: an elongated cranium and a repositioned mandible. These physical changes allowed the articulation of complex sounds, vowels, consonants, thus the development of abstract thinking, symbolic creation, and the ability to evoke distant and intricate concepts. Why did these anatomical changes occur? That is “the” question.

But what is clear, is that humans are not special because they have “the word” as their starting point. Rather, humans evolved anatomically in a way that words became possible.

“At the beginning was the word” is one among the diverse narratives that endorse our species as predestined and with a unique feature — the speaking ability — that placed ourselves at the center of all living beings, and of a universe in which we play some special role.

However, discovering that a progressive and unconscious shift in a small bone determined our unique speaking ability contributes to reposition ourselves as casual products of specific evolutionary processes, like those of any other plant or animal on earth.

This specific finding is not an isolated case in the realm of contemporary knowledge and science.

In general, the advances in science, physics, geology, anthropology, biology of the last five centuries — which is a great amount of time for a single human, but just a short period for humanity — has led us to a new understanding of our position on the planet and in the timeline of the universe.

If our beginning was marked by the belief that we were holding a special position thanks to our special features, which placed us at the

center of the universe, modern science pushed us back, decentralizing humanity to our astonishment and awe of displacement.

In other words, the more we learn about science, the universe and evolution, the less central appears our existence within it (Flanagan 2007).

Scientific progress in the last century compelled us to rethink the narratives that have long defined our origins, identities, and place.

For example, until the early 2000s, paleoanthropology — supported by genetics and cultural biology — framed modern human evolution as a competition, culminating in the victory of *Homo sapiens* over Neanderthals. The dominant narrative portrayed more than 30,000 years of coexistence between the two species⁽¹⁾ as a struggle, emphasizing an intrinsic separation: Neanderthals as an inferior, primitive version of humanity, and *Homo sapiens* as uniquely endowed with language, culture, art, and technological advancement.

However, since the mid 1980's evidence of different stories emerged.

Neanderthals possessed symbolic thought, language, art, and rituals — traits once thought to define only ourselves. In other words, they had “the word”.

More significantly, Neanderthals did not simply vanish; they were absorbed by sapiens. Genetic evidence at the beginning of this Millenium confirmed interbreeding between the species in the Eurasian region, blurring the rigid boundaries once drawn between the homo genre, to the point in which one might even question whether Neanderthal and Sapiens were truly a separate species after all (Green *et al.* 2010).

This shift in perspective represented a cognitive challenge: the long-held idea that *Homo sapiens* was the “best outcome” of “homo” evolution, shaped through competition and exclusion was over. We were not predestined to be central, after all.

Instead, evolution appeared to be a complex, interactive process of absorption, collaboration, and genetic exchange, maybe not even driven by teleological meanings.

Darwin's concept of the *struggle for life* framed competition as the driving force of all living beings, but contemporary paleoanthropology

(1) Even if, at the moment, it is acknowledged that the *Homo* species were not just two, but three, the third one being the so called Denisovan species. See Slatkin, Montgomery and Fernando Racimo, “Ancient DNA and Human History”, *Proceedings of the National Academy of Sciences of the United States of America*, vol. 113, no. 23, 2016, pp. 6380–6387.

pushed this idea further combining archaeology, geology genetics and even physics, showing that human species was not the mere product of isolated triumph of some features over others, but that of an entangled genetic, environmental, biological, and cultural interaction. Interdisciplinarity, technology and worldwide science production have been the main contributors to our displacement and decentralization.

It is worth noting that Darwin's interpretation was shaped by the social, historical, and economic context of nineteenth-century Europe, a cultural setting marked by the idea of competition and natural fitness also used to explain social differences, hierarchies and inequalities (Rayan and Yetha 2010). However, as the concept of evolution appeared a driving force affecting all levels of existence, Charles Darwin, which was a believer, was probably one of the many scholars and scientists who felt the awe of displacement while understanding that the *Descent of Man and Selection in Relation to Sex* (1871) was yet but another decentralizing description of who we are.

However, this decentralizing process is now transitioning to a new "recentralization" phase determined by the latest advances in Quantum Technologies and by the new concepts and possibilities these discoveries introduce into cultural narratives at large (May 2025).

If the history of science in the last (approximately) 500 years, progressively displaced humanity from the center of the cosmos, quantum mechanics (QM) and the advances in the understanding of matter, are now contributing to fostering new possibilities to reverse or debunk this same process. In this sense, centripetal and centrifugal forces meet at the intersection of our contemporary understanding of reality at large, marking the end of a unilateral journey of humans to the "periphery of things".

We are not properly returning to the center of the universe, where we stayed for at least 20,000 years (and maybe even more), but rather we are acknowledging that a prominent role in understanding, manipulating and observing the deep rules of reality is now one of the many possibilities reserved to ourselves, out of all living beings.

2. “God told me so”. Humans at the center of the universe

Religions emerged just like words and languages: entangled with the changes and shifts in the human body and embedded in new processes of the species’ cognitive systems (Cohen 2012; Tononi 2012). Nowadays — like 200,000 years ago — religions are still physically wired in our thinking processes, as McNamara (2009) points out:

The most important regions of the brain for studies of religious expression appear to be a circuit; linking up to the orbital and dorsomedial prefrontal cortex, the ascending serotonergic systems, the mesocortical system, the amygdala, hippocampus and the right anterior temporal lobes (p. 127).

Religions function as structures of meaning that position individuals and groups within the cosmos, offering perspectives on both life and death, with the latter being particularly relevant.

In fact, the ancient Greeks called “humans” with the word “ἄνθρωποι” (*Thnetoi*) — mortals — derived from “θάνατος” (*thanatos*, meaning death). According to them, death was the specific feature representing human condition. From this perspective, one of the worst sins a human could commit was that of acting “ὑβρις” (*hubris*) — with arrogance — which meant essentially forgetting one’s mortality. Hubris entailed an insatiable thirst for power and a refusal to accept the natural limitations imposed to living beings by gravity and space–time.

In ancient Rome, the centrality of human mortality was summarized in the well-known latin recommendation “*Memento Mori*” — remember that you will die.

Yet, the tradeoff for avoiding hubris and remembering mortality, was the consolatory narrative of human centrality. Although humans longed for eternity, they would never have it; however, this did not mean humans were not important. They stood right at the center of divine activity, attention and the whole world was created to their needs.

Religions, although deeply diverse, had all, therefore, the ambiguous function of both reminding humans of their mortal condition, while — at the same time — placing them at the center of creation, as

the most significant beings in the divine plan. Specifically monotheistic traditions located human beings at the center of a meaningful cosmic story, not due to physical centrality but because of their participation in divine consciousness. Human rationality and moral awareness reflected, according to this view, a transcendent dimension of existence (Hart 2013).

As we find, for instance, in the Psalm:

What is mankind that you are mindful of them, human beings that you care for them? You have made them a little lower than the angels and crowned them with glory and honor (Psalm 8:4-5).

And in Islamic tradition, in the Qur'an:

Indeed, we have honored the children of Adam and carried them on the land and sea, and provided for them of the good things, and preferred them above many of those whom We have created with a marked preference (Quran 17:70).

Religions not only gave humans a reason to exist, but they also provided that humans existed for a reason.

The hierarchy endorsing human supremacy was therefore not only social but existential, reinforcing a structure in which power and significance were recognized through a divine validation. More importantly, this perspective placed the ultimate meaning of life not in the present world, but in the afterlife.

There have been big investments in the afterlife by many different civilizations across various epochs and geographies. Burials, temples, buildings that were meant to last forever [...] they were products of groups of humans which expanded into empires, states, and complex societies during what is defined as the neolithic revolution. This expansion was accompanied by the cultural belief that humanity had a centrality within the cosmos and reinforced by the increasing human ability to control and manipulate the environment (Harris 1979).

Humanity had, progressively, refined its capacity to shape the world, from the domestication of plants and animals to advancements in

agricultural techniques (Scott 2017), from the discovery of the chemical processes underlying life, to the development of increasingly sophisticated tools for warfare and domination (Diamond 1997).

Paradoxically, however, this very expansion of knowledge — rooted in the conviction that humans were destined to occupy a privileged position in the universe — ultimately led to the realization that such a position was not central after all.

The awe of displacement accompanied our species through each advance in knowledge, to each amelioration in controlling the environment, transmitted from one generation to the other.

The Copernican Revolution — which was not a sudden discovery but a long process of observation and development, finally shattered the geocentric worldview that had long placed Earth, and thus humanity, at the heart of creation. Nicolaus Copernicus' heliocentric model, later refined by Johannes Kepler's laws of planetary motion and Galileo Galilei's telescopic observations, dismantled the comforting illusion of where we stood.

Galileo's discovery of celestial bodies that did not orbit Earth — such as the moons of Jupiter — challenged the Aristotelian-Ptolemaic model (Ravetz 1966).

Earth stopped being the center of the universe and humans could but follow the path of their planet. While the observation of the macro influenced the standing point of the micro, the awe of displacement spread into the multiple level of societies: from philosophy, to economy, to politics and religion.

Cognitive displacement shook the fundamentals of how we perceived ourselves, how we narrated our place on earth and the meaning we gave to our existence that revealed to be but a fleeting episode in the vast expanse of cosmic and evolutionary time.

3. The periphery of Things

The process displacing humanity from the center of existence to the periphery was gradual, spanning approximately five centuries. It reached a critical turning point in the twentieth century, when multiple

intellectual and technological advances pushed humanity further away and fueled the cultural awe of displacement marking modernity.

The first quantum revolution represented a milestone of the process, with its protagonists standing at the intersection of religion, physics and philosophy, challenged by the study of photons and particles behaving in an unpredictable way.

Werner Heisenberg, Neils Bohr, Erwin Schrödinger in those first decades of the twentieth centuries, were discussing and dismantling the foundation of reality itself.

From a quantum perspective, the universe exists only as a set of probabilistic states, which actualize within the limits imposed by the relationship between the observer and the observed phenomenon (Plotnitsky 2021, pp. 13–21). This meant that not only humans were not central to the reality of the planet, but that reality had no realism. In the play *Copenhagen*, written by Michael Frayn — during a philosophical conversation between Werner Heisenberg and Neils Bohr, the latter remarks: “Throughout history, we keep finding ourselves displaced. We keep exiling ourselves to the periphery of things.”

Michael Frayn, imagining the dialogue between the two physicists, depicts the awe of that very first phase of quantum research, in which reality seemed ultimately ungraspable (Plotnitsky 2021).

However, this decentralizing process did not necessarily signify the “end of history” for humanity, as Francis Fukuyama (1992) has described it.

Nor should this trajectory be interpreted as a linear, irreversible movement toward the “periphery of things”.

A century after the first Quantum Revolution, the development of QM and the recent related scientific findings, such as magnetometers, sensors and transistors, made reality and the manipulation of microparticles flexibly controllable by humans. Cameras, nanomaterials and sensors are embedded in our everyday life, and based on Quantum Technologies, which are developed and based on human science.

From an anthropological and cultural point of view, rather than marking a final displacement, the field of QM introduced a new paradigm that paradoxically reinstated a form of human centrality, albeit one that differs fundamentally from pre-modern or classical conceptions of anthropocentrism.

While the classical, deterministic universe envisioned by Newtonian mechanics has been overturned by the indeterminacy inherent in quantum theory, the quantum paradigm eventually reintroduced humans into a position of ontological centrality through the crucial role of the observer in defining the structure of reality itself. In other words, if the universe does not exist as a precisely determinable objective entity, but rather as a field of probabilities, then its manifestation depends on the very act of observation and measurement. This realization places human cognition at the heart of the physical world once again — not as an absolute ruler of the cosmos, but as an intrinsic component of reality's unfolding, in constant interaction with it.

Reality can be seen as an unfolding of interrelated events rather than static substances. Whitehead (1929) described the universe as a network of experiential processes, where both human consciousness and the material world were co-constituted in a constant state of becoming. His notion of “occasions of experience” aligns closely with quantum entanglement, dissolving the separation between subject and object.

The act of naming, conceptualizing, and interpreting reality — through the word — is therefore not merely an intellectual exercise but an ontological act that defines what aspects of the universe become knowable and manifest. This perspective suggests that the human mind is not merely a passive receptor of an independently existing cosmos but an active participant in shaping the reality it seeks to comprehend. The universe, in this sense, is no longer an autonomous entity unfolding independently of human perception; rather, it is intimately bound to the way humans construct meaning through scientific models, language, and conceptual frameworks (Barad 2007).

The quantum description of reality challenged the classical distinction between subject and object, suggesting that the mere act of measurement collapses a probabilistic wave function into a definite physical state. This principle, often exemplified by the famous double-slit experiment (*ibid.*, p. 103), demonstrates that particles exhibit wave-like or particle-like behavior depending on whether they are observed. This observer effect implies that the universe does not evolve independently of human measurement but instead coalesces into a determinate form through the act of being observed. Such a realization acknowledges that

human cognition and measurement actively shape the way reality materializes. Observation does not have to be conscious nor intentional for particle physics. However, humans are the only conscious living beings able to measure particles (Dennet 1991).

Through this acknowledgment, even the very concept of “periphery” undergoes a fundamental transformation. The displacement of humanity from a privileged position in the cosmos, no longer implies a permanent exile to an insignificant corner of existence. Instead, the emergence of quantum theory and contemporary physics suggests that human consciousness plays an intrinsic role in the structuring of reality itself, which is not merely a return journey from the periphery to the center but rather a qualitative leap, a transformation from one mode of understanding consciousness and existence to another.

The shift underscores the idea that life itself is not a static substance but a continuous process, an emergent and dynamic reality that cannot be reduced to purely mechanistic interpretations. To fully comprehend the nature of human existence, it is no longer sufficient to study life in terms of classical physics or deterministic models; rather, it requires an engagement with the fundamental nature of matter at the quantum level and scaling it up to the macro level, including understanding social systems and the complex interactions that humans entail with one another (Wendt 2015; Trnka and Lorencová 2016).

By delving into the world of subatomic particles, wave functions, and quantum fields, humanity did not only began exploring the fabric of the physical universe, but we also reassessed her own role within she.

4. Matter, information and energy

Just as classical physics continues to shape our everyday lives and influence the ways in which we interact with objects and the material world (Hodder 2024), classical theories of the social sciences still provide effective frameworks for describing the structure and function of societies. However, the emergence of QM introduced a new layer of complexity to our understanding of human social behavior, suggesting that the interactions between individuals, cultures, and the environment

may operate on principles beyond the classical deterministic models (Wendt 2006). If matter itself is fundamentally composed of energy and information, and if human beings are also constituted by the same principles, understanding cultural phenomena would imply considering the materiality they are made of, which means digging deep into particles, brainwaves and considering the myriads of means in which these unite to form organized, complex macro systems able to think and feel (Carroll 2016).

This perspective opens a new avenue of inquiry into how cultures are not static, immaterial and isolated entities but rather entangled systems that interact continuously with their surroundings: the environment, the objects it entails and other cultural systems.

Cultural phenomena might therefore be understood as interwoven networks of meaning, memory, environment and transmission, which persist across generations, are non-local and adapt through evolution.

In this sense, cultures are not merely social constructs, but living, dynamic interactions, continuously oscillating in response to internal structures and external stimuli. Their evolution can be seen as the result of complex informational patterns — waves of shared knowledge, collective practices, and transmitted traditions — that form resonances across time and space. Cultural systems from this point of view function not as static frameworks but as fields of fluctuating matter, energy and meaning, continuously reshaping reality.

From this perspective, the Anthropocene — the proposed epoch marking humanity's central role in planetary change — can be understood not only as a period of environmental crisis but also as an era in which standing at the center of life on the planet entails taking responsibility for deconstructing the dominant cultural paradigms of our time — rooted in industrialization, global capitalism, and technological expansion — and recentering human agency, not in the sense of reinstating a classical anthropocentric worldview, but rather as a call to action: human culture, as an energetic force, has become one of the primary determinants of planetary evolution (Pickering 1995).

Latour (1993) argued that the separation between society and nature is a modern fiction and that we continuously produce hybrids — entanglements of natural and social actors. From this perspective, the

Anthropocene is not just a geological epoch, but a political and epistemological challenge that demands rethinking agency as distributed among humans and nonhumans alike.

The question, then, is whether human cultures will continue to destabilize Earth's ecosystems or whether they can be redirected toward a more sustainable and symbiotic resonance with the environment.

Nietzsche's *Übermensch* — which originally referred to the transcendence of traditional moral and existential constraints — finds echoes today in contemporary cultural movements that seek to overcome the limits of human life, both biologically and spatially (Bostrom 2014). The aspiration to extend longevity, whether through cryogenic preservation, genetic engineering, or biomedical advancements aimed at delaying aging, represents a new iteration of human centrality — one in which control over life and death is reimagined as a technological challenge, rather than a metaphysical inevitability. The drive to push the human lifespan beyond its natural limits — with some scientists envisioning lifespans extending to 120 years or beyond — suggests that, even after the deconstruction of anthropocentrism, human exceptionalism continues to find ways to reassert itself. Similarly, the ambition to colonize other planets and expand human presence beyond Earth, reflects a deeply ingrained notion that our species remains destined to shape and command its environment even on an interstellar scale. These developments indicate that the narrative of human specialness continuously adapts itself to new scientific paradigms. However, this recentralization has new features compared to premodern anthropocentrism: it represents a complex interplay between the acknowledgment of cosmic insignificance and the desire to reclaim agency in the face of human existential uncertainty. The cultural implications of this shift are profound: the *Übermensch*, once a metaphor for self-overcoming in a philosophical sense, is now being reinterpreted in techno-scientific but also economic terms, where the next evolutionary step is no longer intellectual or spiritual but biological and technological and related to social classes, gender and cultures, as Donna Haraway would put it:

I think the world is precisely what gets lost in doctrines of representation and Scientific objectivity (Haraway 1995, p. 295).

The paradox remains: while Quantum research acknowledges the participatory nature of human perception in shaping reality, it does not necessarily reestablish a hierarchical supremacy of human beings over other forms of existence. Instead, it raises ethical and epistemological questions about how we navigate these new frontiers — whether the extension of human agency through technology serves a collective purpose or merely reinforces both older and unedited patterns of domination.

5. Conclusions

The trajectory of human understanding, from the anthropocentric narratives of early civilizations to the decentralization brought about by modern scientific revolutions, has led to a paradox: while science has progressively removed humans from the center of the cosmos, emerging technologies and scientific paradigms suggest a new kind of centrality — one based on participation rather than control. Quantum mechanics challenged decentralizing frameworks of modernity by demonstrating that observation itself plays a role in shaping reality. If measurement and perception actively influence the behavior of particles, human cognition, and even consciousness, is an integral component of how reality is structured. This realization suggests that rather than being exiled to the “periphery of things,” humans occupy a dynamic position — one in which the very act of observation contributes to the understanding of existence. From a social and cultural perspective, QM also introduces new ways of understanding human societies, their structures, and their historical trajectories. If matter, consciousness, and culture can be described in terms of energy and information, then human social dynamics might be viewed as complex systems made of energy, matter and information, continuously interacting with their environment. This model helps explain how cultures evolve, persist, and influence the material world, particularly in an era defined by the Anthropocene, where human activity has become one of the dominant forces shaping planetary change. Thus, the tension between decentralization and recentralization is not a linear progression but a dynamic oscillation — one in which humanity’s role is continually redefined. The interdisciplinary dialogue between QM,

philosophy, and the social sciences plays a vital role in accompanying both the awe of displacement and the recentralization forces that humanity is undergoing. Understanding the entanglement between human cognition, cultural evolution, and the physical universe invites a reevaluation of both scientific paradigms and ethical responsibilities and the positioning of the human in a world in which boundaries between humans and things, and between the micro and macro, are blurred. Ultimately, viewing the displacement of humanity from the “center” might represent the opportunity to redefine centrality itself — not as domination over nature, but as a profound recognition of humans’ embeddedness within it. In this sense, the shift from classical determinism to quantum complexity does not mark the “end of history,” but rather a transformation in how we conceive our place within it.

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