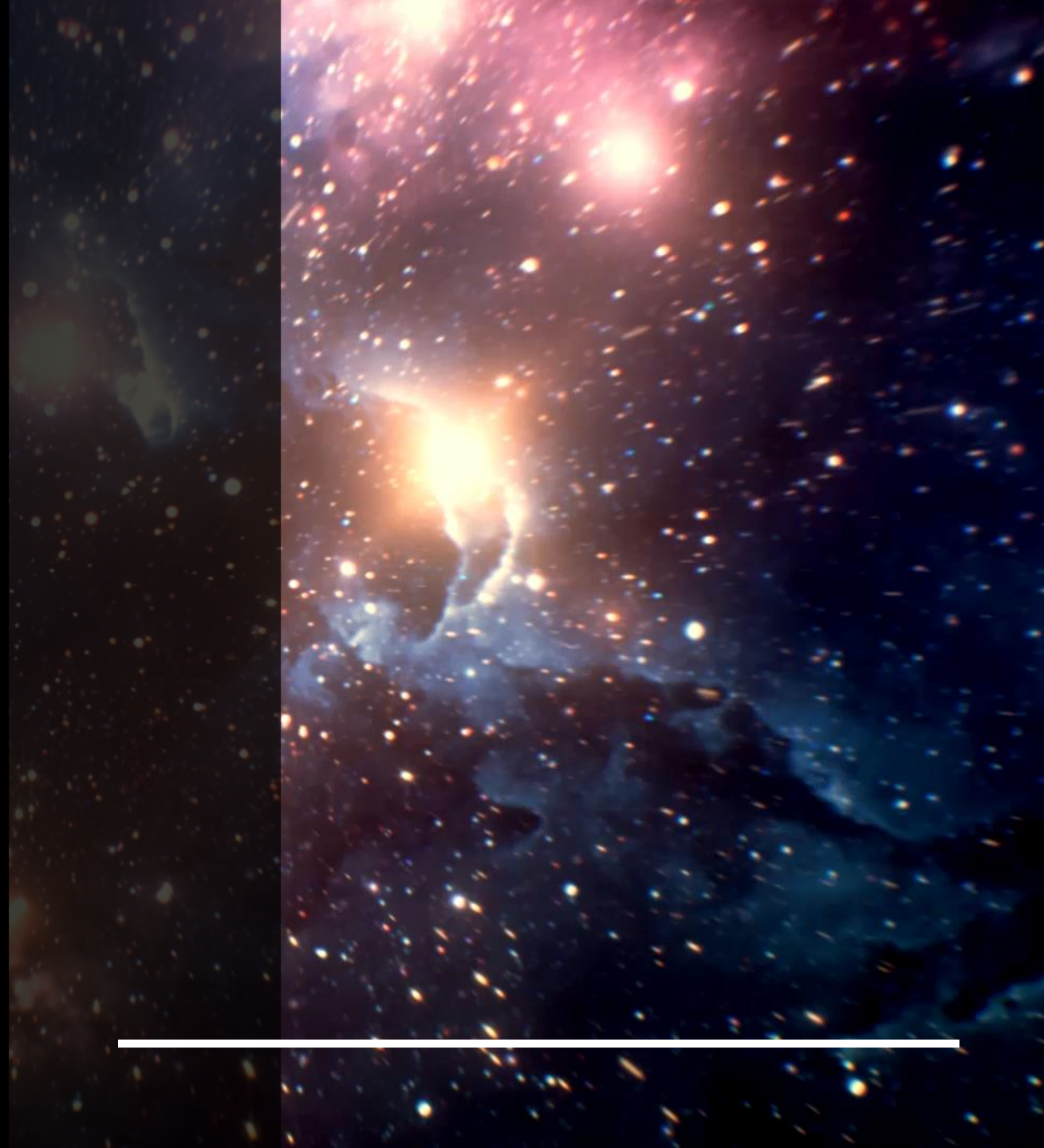
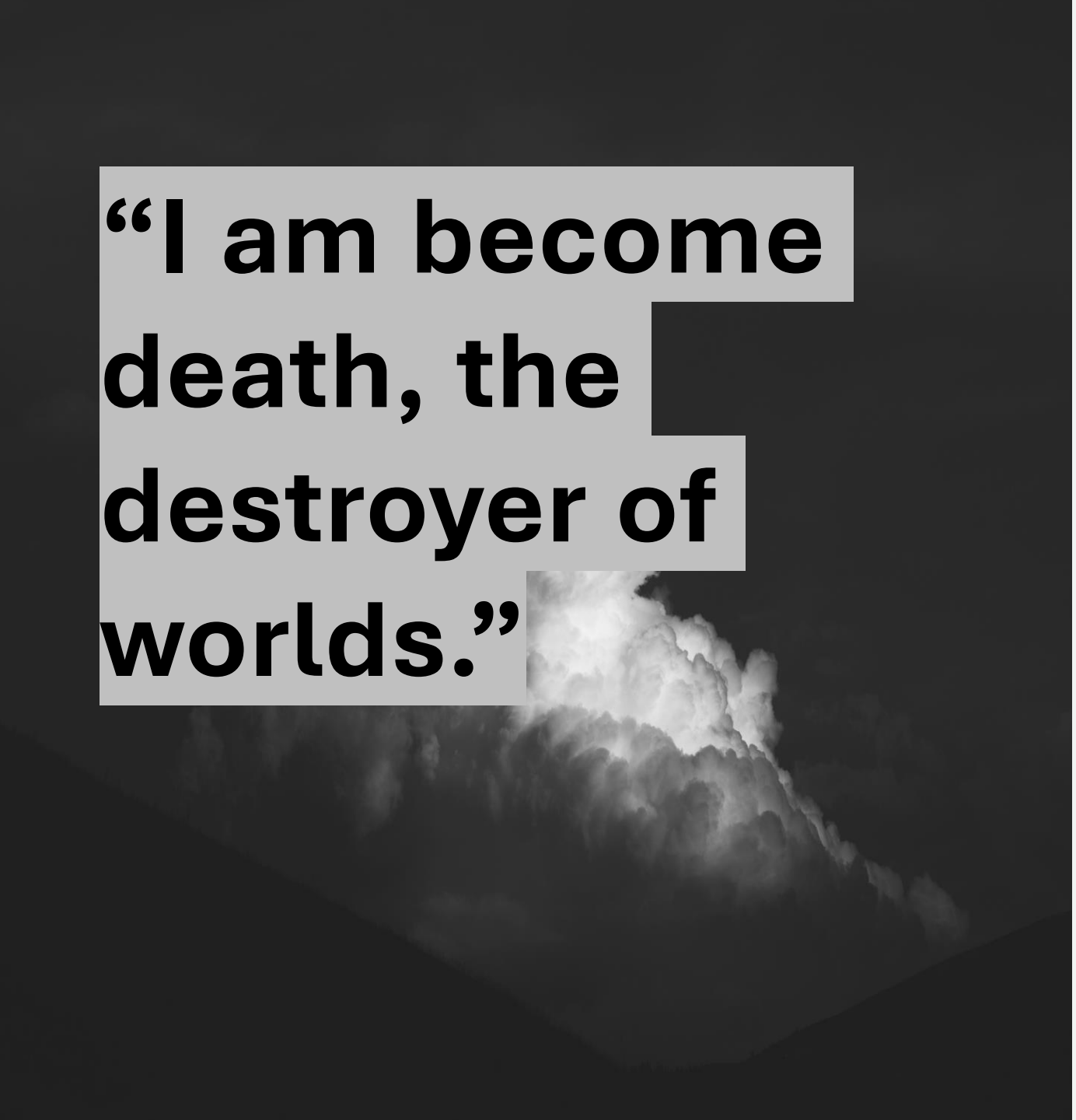
No Small Matter

Mushroom Clouds, Ecologies of Nothingness, and Strange Topologies of Spacetimemattering

- Karen Barad





“I am become death, the destroyer of worlds.”

Matter, what was once previously labelled as inanimate became mortal. Soon after it did, it was murdered, broken apart at the very heart of the atom with violence enough to make heaven and earth quake.

In an instant, a flash of light brighter than a thousand suns, the distance between heaven and earth is crossed, physically crossed, by a mushroom cloud reaching into the stratosphere.



Hiroshima (Haunted landscapes)

- August 6th, 1945, at 08:15 am. The first of two atomic bombs are dropped, this one hits Hiroshima.
- Time frozen with a heat as intense as the sun, it's death captured I shadows on every surface.
- It was never before possible to kill time in this way, the frozen clocks now emblematic of nuclear destruction and time being stopped in waves.
- When nuclear forces are harnessed and unleashed, Time is crosses out. With this technology time has a finite lifetime and it is subject to diffractions and entanglements, alike Space.

"Time will not be the same, at least not for the time being."

Flickr. (2022). *Flickr*. [online] Available at: https://www.flickr.com/photos/pingnews/1861148468 [Accessed 25 Jan. 2022].



Hibakusha

https://www.youtube.com/watch?v=J2ENT9_ciXc

- The word Hibakusha directly translates to bomb affected people, there are certain recognised categories of Hibakusha under the Relief Law.

- It was only after much activism and insistence from the Hibakusha that they received compensation from the government in the form of financial and medical assistance for those with official status

- Many Hibakusha not only suffered ill health because of the bomb, but were also heavily discriminated against due to a lack of understanding about radioactive contamination and exposure, which continues today, renewed by the incident at Fukushima Daiichi.

- All of this information can be found on their website. I highly recommend giving it a read as they are an incredibly powerful; group of people. https://hibakushastories.org/who-are-the-hibakusha/

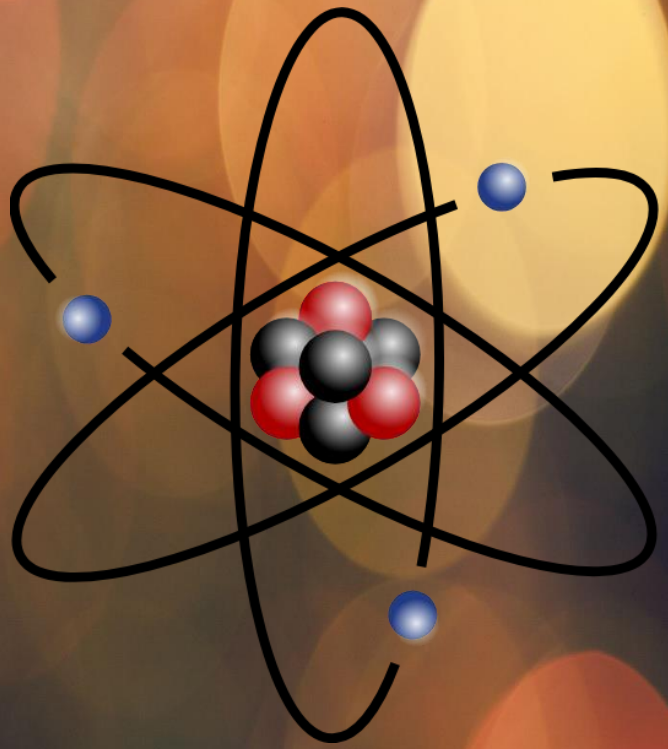
What’s a haunted landscape?



- A place where losses are shown in every surface, by loss Barad means the marked presence between absence and presence.

- Silence, “ghastly stillness” and “deathly silence”
- Silence also in the deaths and awareness of that negative space.
- These landscapes are certainly haunted, not just by memories or past events.
- Hauntings are an ineliminable feature of existing material conditions.

What's the scale of nuclear force?



- The splitting of an atom, more precisely its nucleus, a force a millionth of a billionth of a metre in length reaches global proportions, destroys cities in a flash, reconfigures political alliances, and changes other large-scale forces of the planet.

- This should destroy the notion a scale when the question arises as to what quantum physics has to do with the macro world.

Wikimedia.org. (2020). *File:Stylised atom with three Bohr model orbits and stylised nucleus.svg - Wikimedia Commons*. [online] Available at: https://commons.wikimedia.org/wiki/File:Stylised_atom_with_three_Bohr_model_orbits_and_stylised_nucleus.svg [Accessed 25 Jan. 2022].

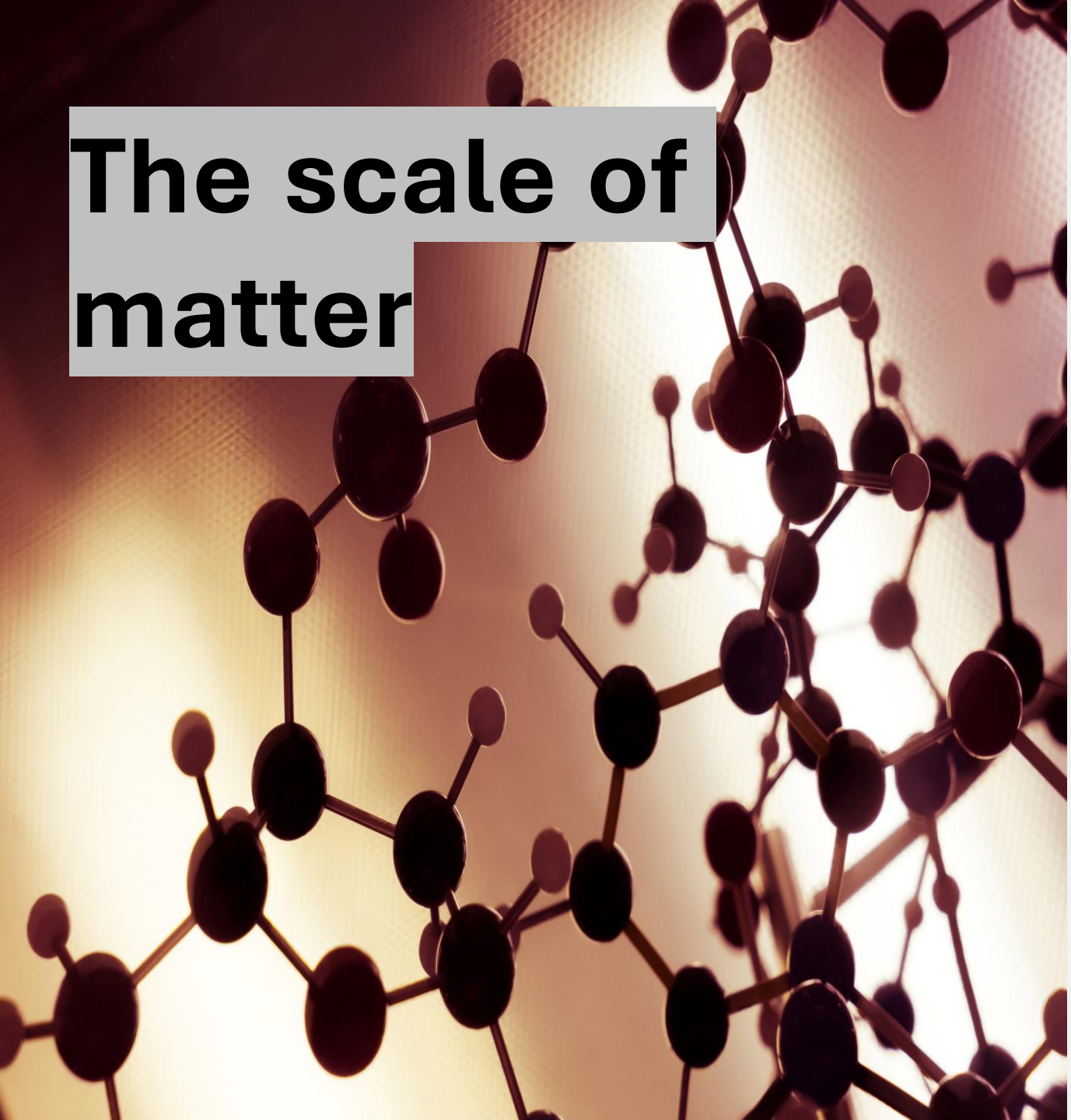
What’s times measure?



- In a flash of an eye, the explosion is over but forever lives on. Bodies near ground zero become molecular, hibakusha in the vicinity ingest radioactive isotopes that rework body molecules, little time bombs waiting to go off.

- So even though the bomb went off, the cascading energy of the split nuclei, lives on and continues its explosion in the interior and exterior of bodies.

- Radioactivity inhabits time beings and resynchronises and reconfigures Spacetimemattering. Radioactivity frays time’s coherence, leaving time unstable, constantly leaking away from itself.

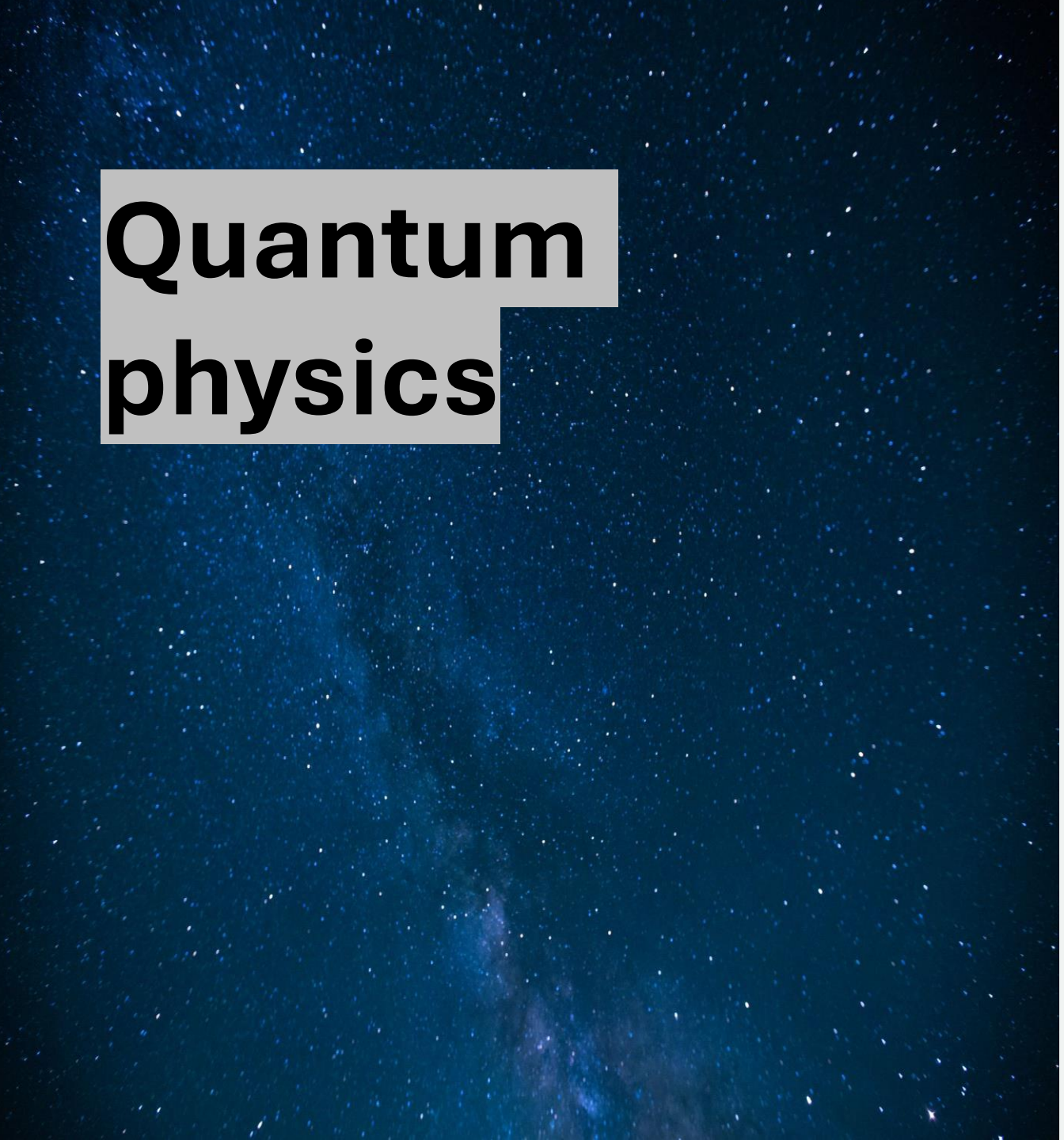


The scale of matter

- We are stardust, a strange topology of space-time-matter measures each contained within one another and threaded through each other.

- Joseph Masco- we need to examine the effects of the bomb at every scale, from the grandest cosmological to the scale of subatomic particles,

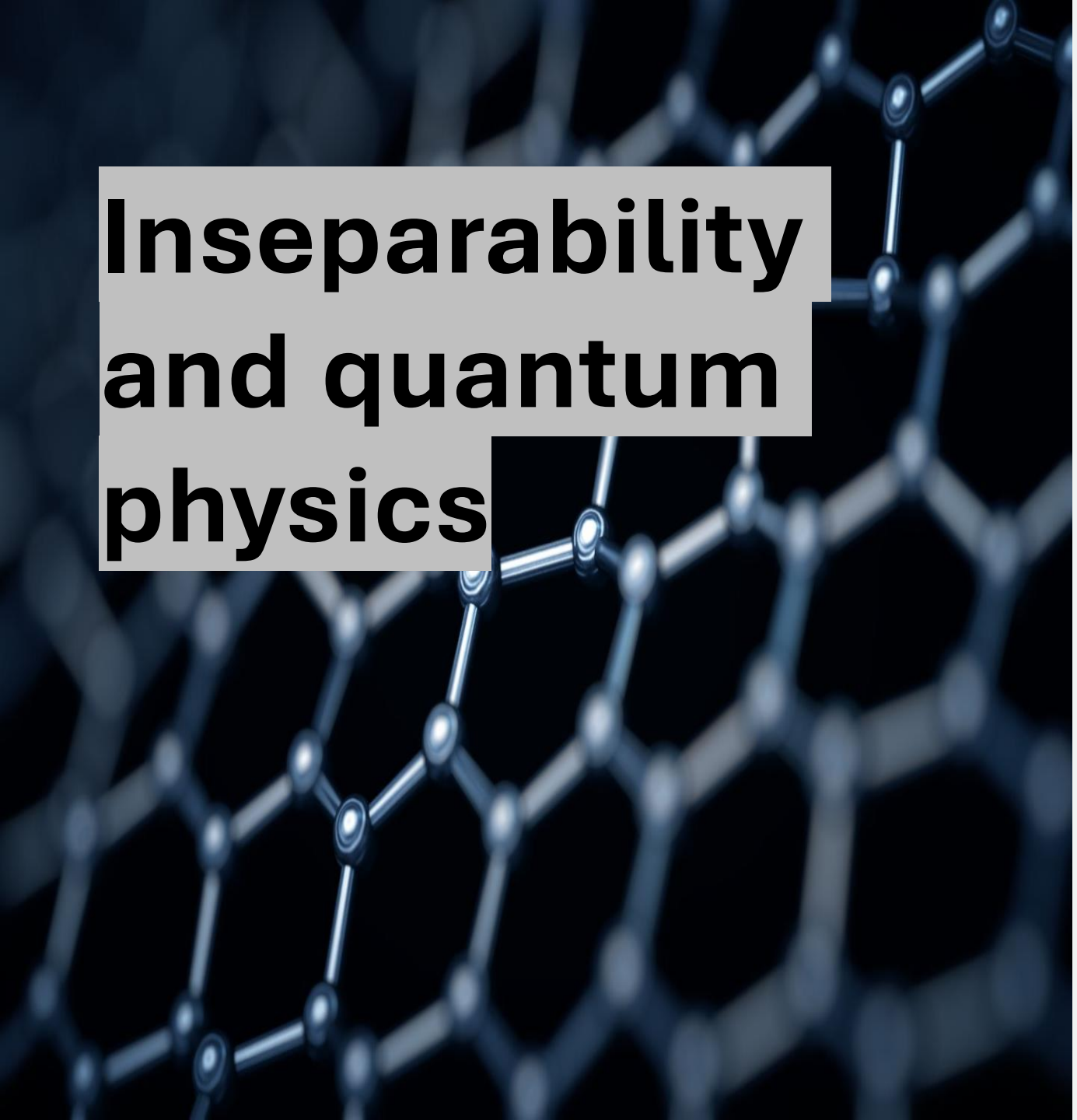
- So, what tools might we use to understand not only the entanglements of phenomena, but also the specific configurations of space, time and matter?



Quantum physics

-Quantum physics provides useful conceptual tools for understanding the politics of matter in the nuclear age, because its fully implicated in and marked by the making of an atomic bomb.

-The theory and the bomb materially inhabit and constitute each other.



Inseparability and quantum physics

The Newtonian ideas of Space Time and Matter are undone by quatum physics, in particular the assumption of separability and metaphysical individualism.

There are no self-contained individual entities in the void.

Matter is always already caught up with nothingness, bodies, space, time, the void are not ontologically separate matters.

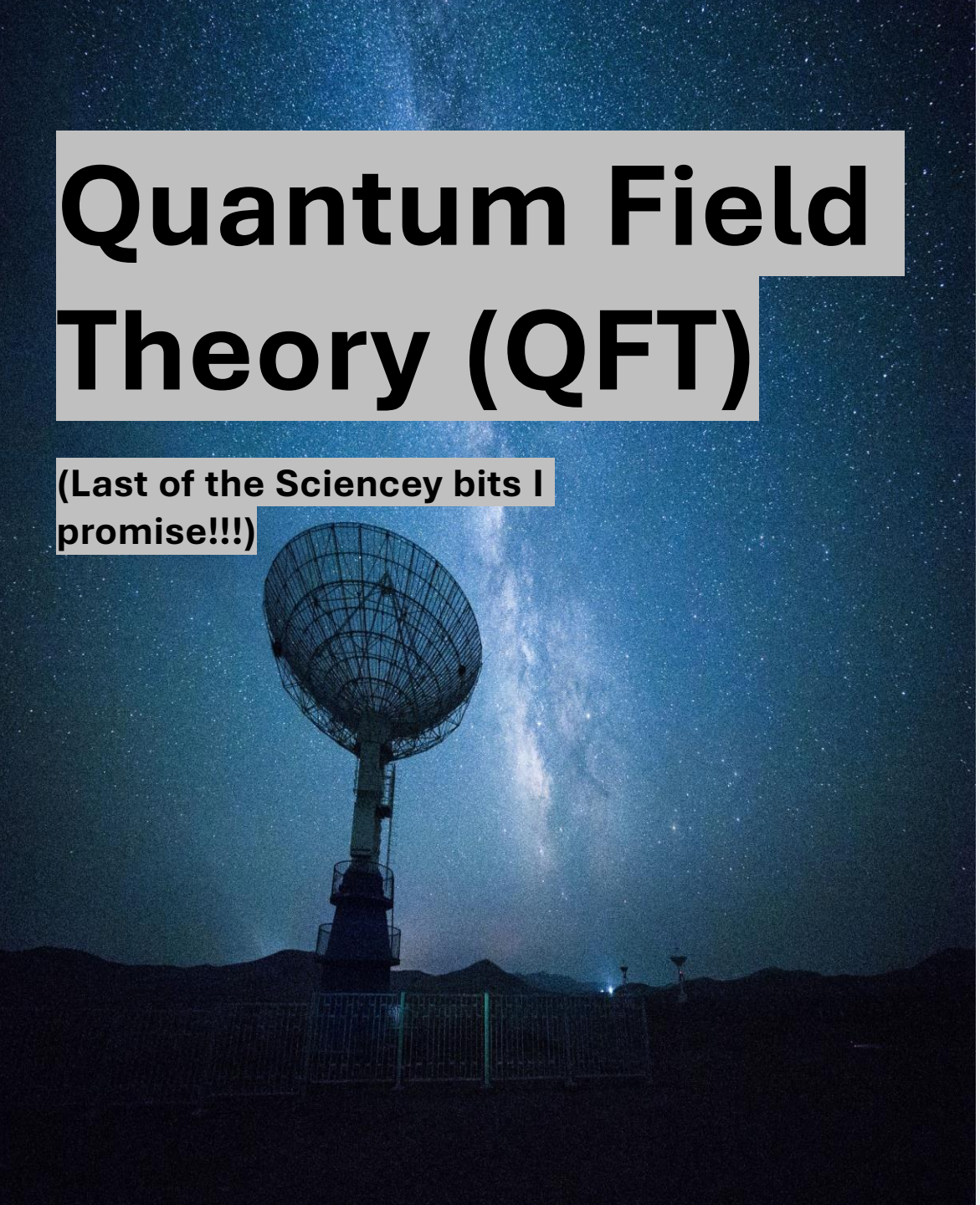
Contrary to Newtons conception that there are external forces acting upon inert matter, quantum physics understands matter as agential, and the multiplicity of forces are immanent in the sphere they operate.

Agential realism

Agential realism understands the nature of matter and the very matter of nature as being figuratively reconstituted through a multiplicity of force relations. This doesn’t invalidate notions of force, time, resistance, etc. Rather it asks question to understand them in their materiality and asks how such things come into existence, rather than analysing them after they arrive.

So, on this, quantum entanglements are the core of this relational agential ontology. Entanglements aren’t just the intertwining of separate events and entities. Entanglements are the inseparability on intra acting agencies. Natural cultural phenomena are entanglements, the effect of dynamics of interactive intra activity.

Phenomena are specific material relations of the differentiating world where relationships need to be understood as constituted through force relations. They are not apart of space and time and are the entanglements threaded through Spacetimemattering of the universe. Entanglements are the iterative intra active re configurations and enfolding of Spacetimemattering



Quantum Field Theory (QFT)

(Last of the Sciencey bits I promise!!!)

Quantum field theory (QFT) states that matter is not eternal. Birth and death aren't just inevitabilities of the animate world, so called inanimate beings are also mortal. Particles have a finite lifetimes and decay times.

Particles are born from the void, go through transformations, die, return to the void and are reborn, all the while being inseparable from the material imaginings of the void.

The void is not nothing, but its flush with the imaginings of what could be/might yet have been. Nothingness is a material presence, not what the insinuation of emptiness would say.

The void is an active constituent part of everything, even the smallest bits of matter are haunted by an infinity of possible configuring's of Spacetimemattering in their specificity. Entire worlds in each point each specifically configured. Infinitesimals are infinite. Matter is spectral, an infinite multiplicity of histories present/absent in the indeterminacy of time being.

Each moment is threaded through all other moments, a diffraction patterns created by a plethora of virtual wanderings, of histories of what is and what might have been.



Why politics is always here- mishandling of nuclear power

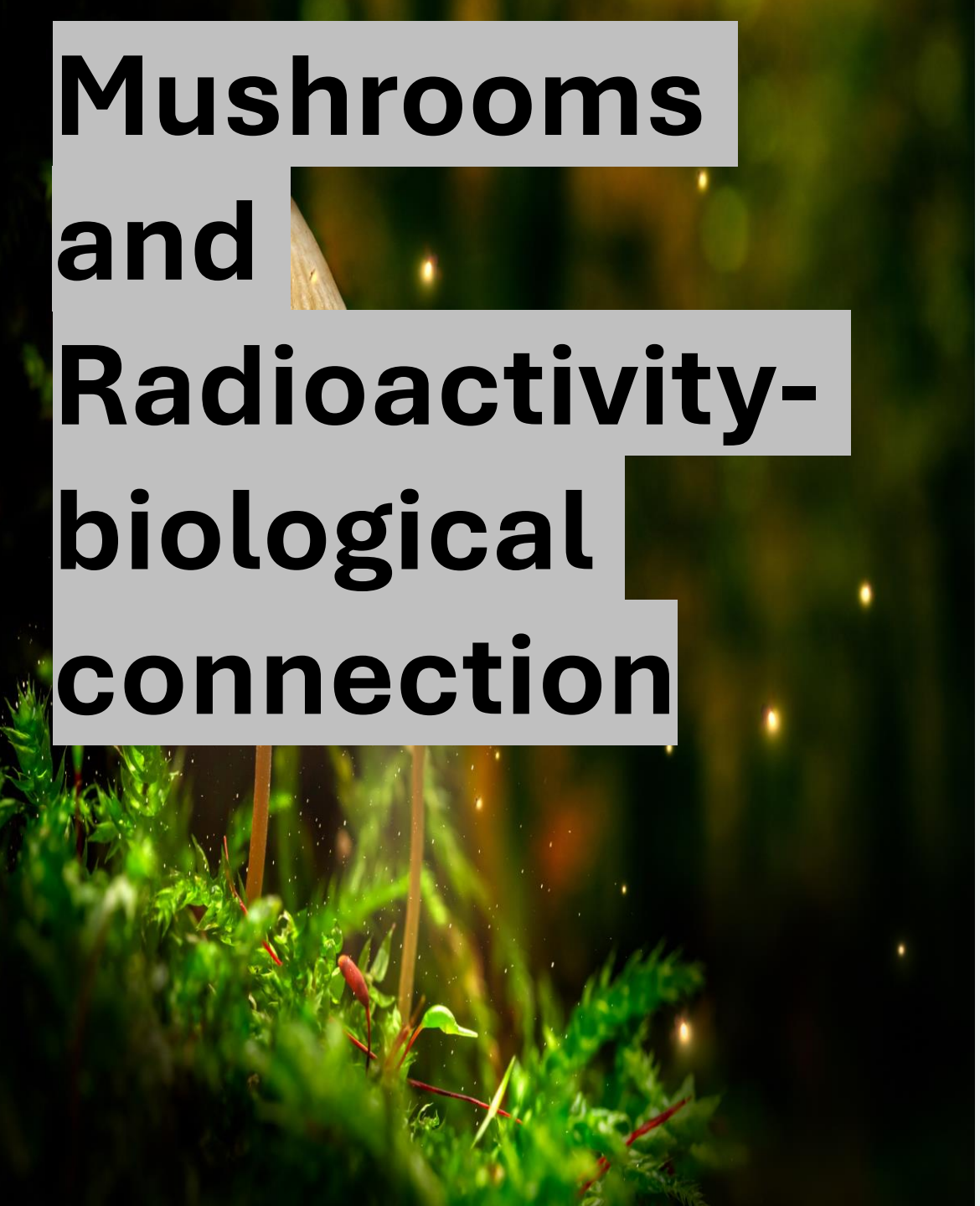
Nuclear power is inherently political, the theory and the bomb.

Case example, Fukushima Daiichi, illegal radioactive waste dumping.

Radioactive wood chips dumped along Kamo River, the primary water source for around 17 million residents.

The sentence passed down was 1.5 years in prison, 5000 tonnes of woodchips are still unaccounted for, as their dump sites are publicly unknown.

(Supdigital.org, 2022)

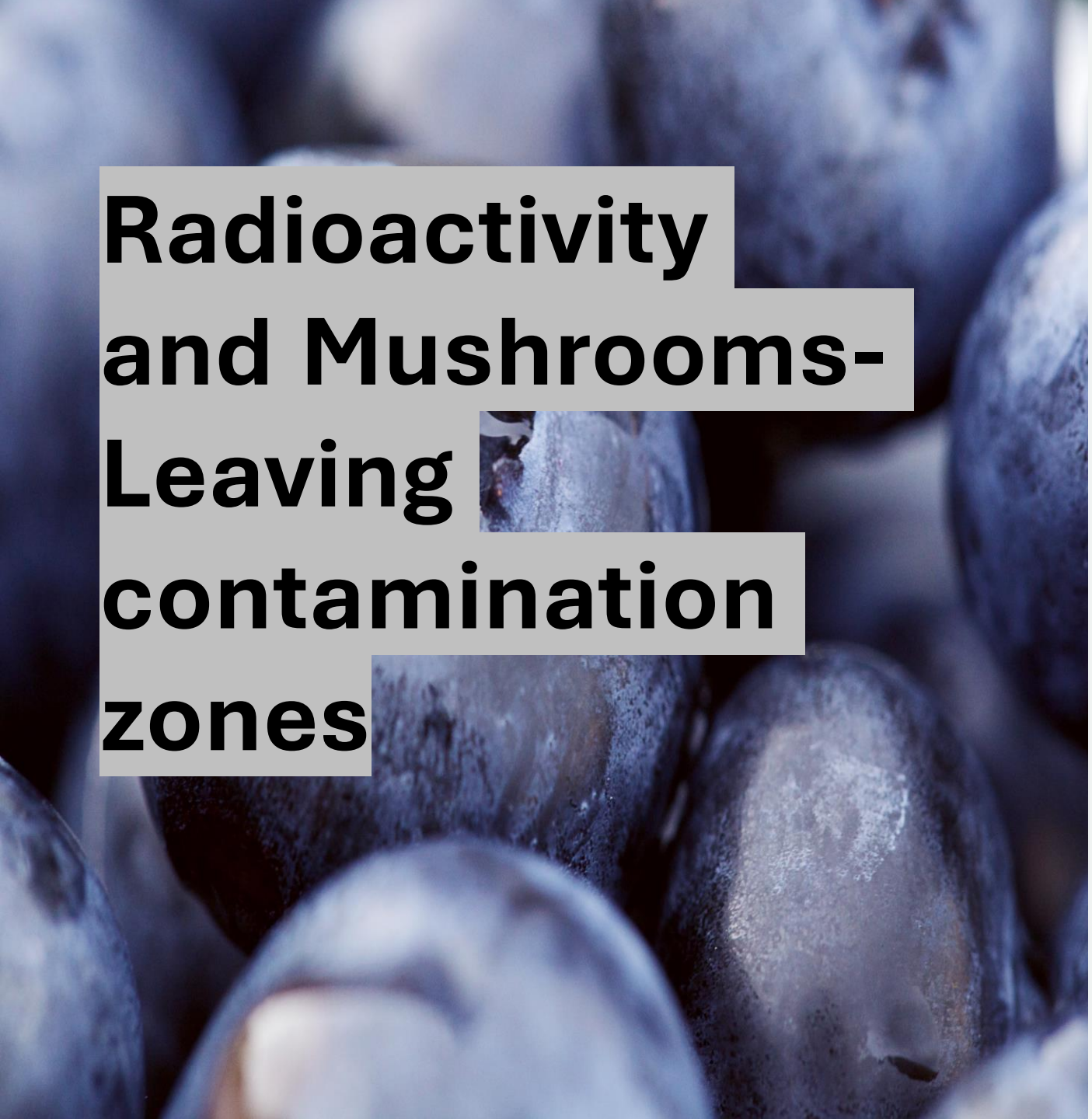


Mushrooms and Radioactivity- biological connection

- Mushrooms are the ultimate pharmakon traditionally associated with life and death.

“When Hiroshima was destroyed by an atom bomb in 1945, it is said, the first living thing to emerge from the blasted landscape was a matsutake mushroom.”

Whether that story is historically accurate or not, it is verified that mushrooms were found in the immediate area and growing inside the Chernobyl reactor, so mushrooms are linked to areas of high radioactivity. This is because Radioactivity is a pharmakon, and it’s entangled with mushrooms in specific ways. Fungi contains melanin that thrives on the radioactive emissions, Radio tropic fungi replace photosynthesis with this process for food.



Radioactivity and Mushrooms- Leaving contamination zones

Using the fungi, the radioactive materials inside can hitch a ride out of contamination zones by climbing up the food chain. But it’s not the only plant who can.

Radioactive Blueberries- Ukraine is the largest exporter of blueberries to the European union as of 2014. Yet a lot of the berries that are from the Chernobyl area are above the permissible dose for radiation, this is bypassed by having them mixed in with cleaner ones to stay under the threshold of 1250 per kilogram.

In 2016, EU regulators doubled the maximum permitted levels of radioactivity in food products.

(Supdigital.org, 2022)



Radioactivity and Mushrooms- Nuclear remediation

Yet scientist also see a possibility of using mushrooms for nuclear remediation, this being considered for Fukushima because fungi can absorb the radiation, specifically Cs-137, the radioactive isotope from Caesium.

- The best mushrooms to plant are the ones with the biological characteristics of parasitic, mycorrhizal and saprophytic. (Rhs.org.uk, 2022)
- Once they've grown then burn the mushrooms and store the ash.
- This process would take many years

(Stanford.edu, 2016)



Mushrooms and Clouds

- Analysis of cloud cover of the Amazon supports a linkage between the potassium released from fungi living in the rainforest and cloud formation.

- Lawrence’s radiation lab, made clouds to detect the ionizing radiation that fungi feed on (Wilson clouds).

- “Mushrooms within clouds within mushrooms, and infinities of infinities inside each infinitesimal.”

It’s not only that there’s a link between terrestrial and atmospheric mushrooms, but also the uncanny material topologies each inhabiting the other.

Conclusion

All these material phenomena we've discussed from the atomic bomb to mushrooms thriving in radioactive areas, and mushroom clouds, all of these are constituted through one another, each in specific entangled ways. It's not matter of things being connected across scales, rather matter itself in its very materiality is differentially constituted as an explosion/implosion; a superposition of all possible histories constituting each bit.

Matter is not only political all the way up and down; it has all matters of matter inside it.

Planetary geopolitics inside a morsel- a strange topology, an implosion/explosion of no small matter.



Quick critique

- Very emotive

- The use of rhetorical questions made it very engaging in places

- Definitely makes you think!

- Hard to understand in places especially during the pages on quantum sciences

- Also the long lists of adjectives can make it feel overwhelming to read


Questions?



Reference List

- Barad, K. (2017). *No Small Matter: Mushroom Clouds, Ecologies of Nothingness, and Strange Topologies of SpaceTimeMattering*. [online] Arts of Living on a Damaged Planet. Available at: https://www.academia.edu/39975279/No_Small_Matter_Mushroom_Clouds_Ecologies_of_Nothingness_and_Strange_Topologies_of_SpaceTimeMattering [Accessed 26 Jan. 2022].

- NHK WORLD-JAPAN (2019). *Farewell, Father - LETTERS FROM HIBAKUSHA [HIROSHIMA]*. *YouTube*. Available at: https://www.youtube.com/watch?v=J2ENT9_ciXc [Accessed 25 Jan. 2022].

- Sink, B. (2013). *Who Are The Hibakusha? | Hibakusha Stories*. [online] Hibakusha Stories. Available at: https://hibakushastories.org/who-are-the-hibakusha/ [Accessed 25 Jan. 2022].

- Supdigital.org. (2022). *Feral Atlas*. [online] Available at: https://feralatlas.supdigital.org/poster/chernobyl-is-going-global [Accessed 25 Jan. 2022].

- Stanford.edu. (2016). *Fungal Nuclear Remediation*. [online] Available at: http://large.stanford.edu/courses/2016/ph241/stein1/ [Accessed 25 Jan. 2022].

- Supdigital.org. (2022). *Feral Atlas*. [online] Available at: https://feralatlas.supdigital.org/poster/public-works-distribute-fukushima-waste [Accessed 25 Jan. 2022].

- Rhs.org.uk. (2022). *Saprophytic fungi*. [online] Available at: https://www.rhs.org.uk/biodiversity/saprophytic-fungi [Accessed 26 Jan. 2022].