

Epicurus' Prolepsis vs Heraclitus' Flux

Post by "Cassius" of July 10, 2025 at 9:13 AM

I may come back and delete this post later if i find better information, but I think we have an obligation to those who "lurk" but don't participate not to let a debate go too far in a certain direction without refocusing it on making sure it is consistent with the purpose of the forum.

Pending further research I have posed the following question to the latest Grok and I believe the response, especially in its opening restatement of the question, is helpful with a general understanding of the issues involved. Even if details of the positions attributed to the particular individuals prove to be incorrect, this still seems to me to be a helpful summary.

Those who have time and inclination can parse through this response and continue to discuss it's accuracy or inaccuracy. Those who do not have time or inclination to do so will still gain, in my view, an appreciation that there are complex issues here, many of which are not "settled."

I hope those who are interested in this will continue to hammer out these issues.

Question:

What modern physicists, if any, continue to maintain a "physicalist" model of the universe as opposed to those models which are more consistent with a Heraclitean flux where certain knowledge is impossible?

Answer:

The distinction between a "physicalist" model of the universe and a Heraclitean flux perspective, where constant change undermines certain knowledge, is a deep philosophical divide in modern physics.

Physicalism, in this context, refers to the view that the universe is fundamentally composed of physical entities governed by consistent, discoverable laws, often tied to a mechanistic or reductionist framework. A Heraclitean flux perspective, by contrast, emphasizes constant change, indeterminacy, and the limits of certain knowledge, aligning with interpretations that prioritize process, emergence, or fundamental uncertainty (e.g., some interpretations of quantum mechanics). Below, I'll outline key modern physicists and their leanings, based on their work and public statements, focusing on whether they align with a physicalist model or a Heraclitean flux-like view. Since direct evidence of their philosophical stances is often implicit, I'll draw from their contributions, writings, and interviews, supplemented by web and X post analysis where relevant. Note that many physicists don't explicitly label themselves as

physicalists or flux advocates, so I'm inferring based on their approaches to fundamental physics.

Physicists Aligned with a Physicalist Model: Physicalist-leaning physicists tend to favor theories that seek unified, objective, and deterministic (or at least predictable) descriptions of reality, often rooted in reductionism or the belief that fundamental laws govern all phenomena.

1. Sean Carroll

- Position: Theoretical physicist, known for work in cosmology, quantum mechanics, and the foundations of physics.
- Physicalist Leanings: Carroll is a prominent advocate of the "core theory" (quantum field theory plus general relativity) as a complete description of everyday phenomena. He supports a physicalist worldview through his promotion of naturalism and the idea that the universe is governed by fundamental laws, as seen in his book *The Big Picture* (2016). His Everettian (many-worlds) interpretation of quantum mechanics assumes a universal wavefunction, which, while non-deterministic in observation, is deterministic in its evolution, aligning with physicalism.
- Evidence: In his blog posts and podcasts (e.g., *Mindscape*), Carroll emphasizes that physics provides a reliable framework for understanding reality, rejecting metaphysical uncertainties that undermine objective knowledge.
- Counterpoint: His acceptance of emergent phenomena (e.g., consciousness) might resonate with flux-like ideas, but his commitment to underlying laws keeps him firmly physicalist.

2. Steven Weinberg (deceased 2021, but influential in modern physics)

- Position: Nobel laureate, known for contributions to the electroweak theory and cosmology.
- Physicalist Leanings: Weinberg was a staunch reductionist, arguing in *Dreams of a Final Theory* (1992) that physics could, in principle, uncover a unified theory of everything. He viewed the universe as governed by simple, universal laws, a hallmark of physicalism.
- Evidence: His writings dismiss speculative or flux-like views that prioritize indeterminacy, focusing instead on the predictive power of physical theories.
- Counterpoint: Weinberg acknowledged the limits of current knowledge (e.g., in quantum gravity), but his goal was always a complete, objective description, not a Heraclitean flux.

3. Lisa Randall

- Position: Theoretical physicist, known for work on extra dimensions and particle physics.
- Physicalist Leanings: Randall's work on models like the Randall-Sundrum framework assumes a universe with consistent, discoverable physical structures (e.g., extra-dimensional branes). Her books, like *Knocking on Heaven's Door* (2011), emphasize the power of the scientific method to uncover objective truths.

- Evidence: Her focus on testable predictions and mathematical rigor aligns with a physicalist commitment to stable, knowable laws.
- Counterpoint: She acknowledges complexity in cosmology, but her approach remains reductionist, not flux-oriented.

4. Brian Greene

- Position: String theorist and popularizer of science.
- Physicalist Leanings: Greene's work on string theory seeks a unified framework for all physical interactions, assuming a fundamental, law-governed reality. In *The Elegant Universe* (1999) and *The Fabric of the Cosmos* (2004), he presents the universe as ultimately comprehensible through physical laws, even if those laws involve high-dimensional strings.
- Evidence: His advocacy for string theory and his rejection of overly speculative, non-testable ideas suggest a physicalist stance.
- Counterpoint: String theory's untestable nature could align with flux-like uncertainty, but Greene's optimism about eventual empirical confirmation keeps him in the physicalist camp.

Physicists Aligned with a Heraclitean Flux Perspective: Physicists leaning toward a Heraclitean flux view often embrace indeterminacy, emergent phenomena, or the idea that reality is fundamentally process-based or unknowable in an absolute sense. This aligns with interpretations of quantum mechanics (e.g., Copenhagen or QBism) or theories emphasizing complexity and change.

1. Lee Smolin

- Position: Theoretical physicist, known for loop quantum gravity and cosmological natural selection.
- Flux Leanings: Smolin explicitly critiques reductionist physicalism in books like *Time Reborn* (2013), arguing that time is fundamental and the universe evolves through dynamic processes, not fixed laws. His cosmological natural selection hypothesis suggests laws themselves may change, resonating with Heraclitean flux.
- Evidence: Smolin's rejection of timeless, universal laws and his emphasis on relational, evolving systems (e.g., in loop quantum gravity) align with a flux-like view where certain knowledge is limited by the universe's inherent changeability.
- Counterpoint: He still seeks mathematical frameworks, which could be seen as physicalist, but his focus on process over static laws leans toward flux.

2. Carlo Rovelli

- Position: Theoretical physicist, co-founder of loop quantum gravity.
- Flux Leanings: Rovelli's relational interpretation of quantum mechanics and his book *The Order of Time* (2017) emphasize that reality is fundamentally relational and time-dependent, with no fixed, objective structure. He argues that physics reveals a world of processes, not things, aligning closely with Heraclitean flux.
- Evidence: His writings, such as *Helgoland* (2020), embrace quantum indeterminacy and the limits of absolute knowledge, suggesting that our descriptions of reality are

always contextual.

- Counterpoint: Rovelli's commitment to mathematical rigor might seem physicalist, but his philosophical stance prioritizes change and relationality.

3. Nima Arkani-Hamed

- Position: Theoretical physicist, known for work on the amplituhedron and fundamental physics.
- Flux Leanings: While Arkani-Hamed works on unifying theories, his exploration of the amplituhedron suggests that space and time may not be fundamental, but emergent from more abstract structures. This challenges physicalist assumptions of a fixed spacetime framework and aligns with a flux-like view where reality is process-based.
- Evidence: His lectures (e.g., at the Institute for Advanced Study) emphasize that traditional notions of particles and fields may be illusions, pointing to a deeper, dynamic reality.
- Counterpoint: His search for new mathematical frameworks could be seen as physicalist, but the radical rethinking of spacetime leans toward flux.

4. David Bohm (deceased 1992, but influential)

- Position: Quantum physicist, known for the Bohmian interpretation of quantum mechanics.
- Flux Leanings: Bohm's concept of the "implicate order" in *Wholeness and the Implicate Order* (1980) describes reality as a dynamic, interconnected process, where the universe unfolds and enfolds in a constant flux. This rejects the static, particle-based physicalism of classical physics.
- Evidence: His emphasis on holism and the impossibility of fully separating observer from observed aligns with Heraclitean ideas of constant change and epistemic limits.
- Counterpoint: Bohmian mechanics is deterministic, which could seem physicalist, but its holistic, process-based ontology is flux-like.

Mixed or Ambiguous Positions: Some physicists straddle the line, acknowledging both the power of physical laws and the limits of certain knowledge:

1. Roger Penrose

- Position: Mathematical physicist, known for work on black holes and consciousness.
- Mixed Stance: Penrose's work on general relativity and quantum gravity (e.g., twistor theory) seeks objective laws, aligning with physicalism. However, his ideas about the limits of computation (e.g., in *The Emperor's New Mind*, 1989) and the cyclic cosmology model suggest a universe with fundamental uncertainties and dynamic cycles, leaning toward flux.
- Evidence: His recent work on conformal cyclic cosmology emphasizes change and renewal, but he remains committed to mathematical objectivity.
- Conclusion: Penrose blends physicalist rigor with flux-like openness to radical change.

2. Sabine Hossenfelder

- Position: Theoretical physicist, known for critiques of modern physics.
- Mixed Stance: Hossenfelder is a physicalist in her commitment to testable state laws, as seen in her book *Lost in Math* (2018).
- Evidence: Her critiques of speculative theories (e.g., multiverse) show skepticism of flux-like indeterminacy, but her acknowledgment of quantum randomness and the limits of current theories introduces a flux-like humility.
- Conclusion: She leans physicalist but is open to the limits of knowledge.

Summary

- Physicalist-Leaning Physicists: Sean Carroll, Steven Weinberg, Lisa Randall, Brian Greene. These physicists emphasize stable, discoverable laws and a reductionist view of the universe.
- Flux-Leaning Physicists: Lee Smolin, Carlo Rovelli, Nima Arkani-Hamed, David Bohm. These thinkers embrace dynamic, relational, or emergent views where change and uncertainty limit absolute knowledge.
- Mixed Cases: Roger Penrose, Sabine Hossenfelder, who balance objective laws with openness to fundamental change or limits.

The divide reflects ongoing debates in physics about whether the universe is a fixed, knowable system or a dynamic, ever-changing process.