

# Taking climate change seriously: What types of transformations are really needed?

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ASIA PACIFIC

## *Climate-Related Death of Coral Around World Alarms Scientists*

By MICHELLE INNIS   APRIL 9, 2016



A turtle swimming over bleached coral near Heron Island, in the southern Great Barrier Reef.

XL Catlin Seaview Survey

## Contribution of Antarctica to past and future sea-level rise

Robert M. DeConto<sup>1</sup> & David Pollard<sup>2</sup>

Polar temperatures over the last several million years have, at times, been slightly warmer than today, yet global mean sea level has been 6–9 metres higher as recently as the Last Interglacial (130,000 to 115,000 years ago) and possibly higher during the Pliocene epoch (about three million years ago). In both cases the Antarctic ice sheet has been implicated as the primary contributor, hinting at its future vulnerability. Here we use a model coupling ice sheet and climate dynamics—including previously underappreciated processes linking atmospheric warming with hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs—that is calibrated against Pliocene and Last Interglacial sea-level estimates and applied to future greenhouse gas emission scenarios. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500, if emissions continue unabated. In this case atmospheric warming will soon become the dominant driver of ice loss, but prolonged ocean warming will delay its recovery for thousands of years.

THE CURRENT PLANS TO TACKLE RISING SEA LEVELS DUE TO GLOBAL WARMING...



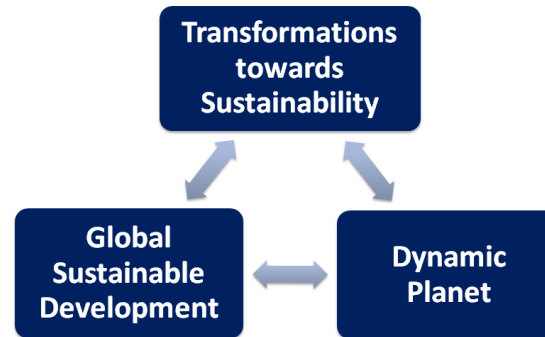
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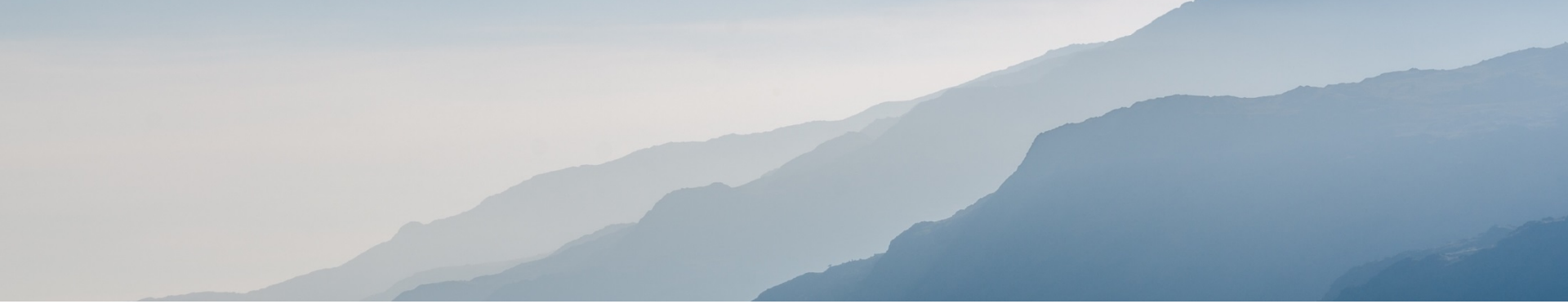




Transformations: *How do we make them happen?*



Transformations theme: Understanding transformation processes and options, assessing how these relate to human values, emerging technologies and economic development pathways, and evaluating strategies for governing and managing the global environment across sectors and scales.



**Transition:** a change from one state or condition to another.







**Transformation:** Physical and/or qualitative changes in form, structure, or meaning-making.







- Do we have a sufficient knowledge base to inform strategies and actions for equitable, ethical and sustainable transformations at the scope, scale, speed and depth that is called for?
- Can we transform rapidly enough, and with sufficient intelligence?
- How do we govern and guide transformations, recognizing that some will experience losses?
- Can we transform in a participatory manner?
- Does science itself need to transform?

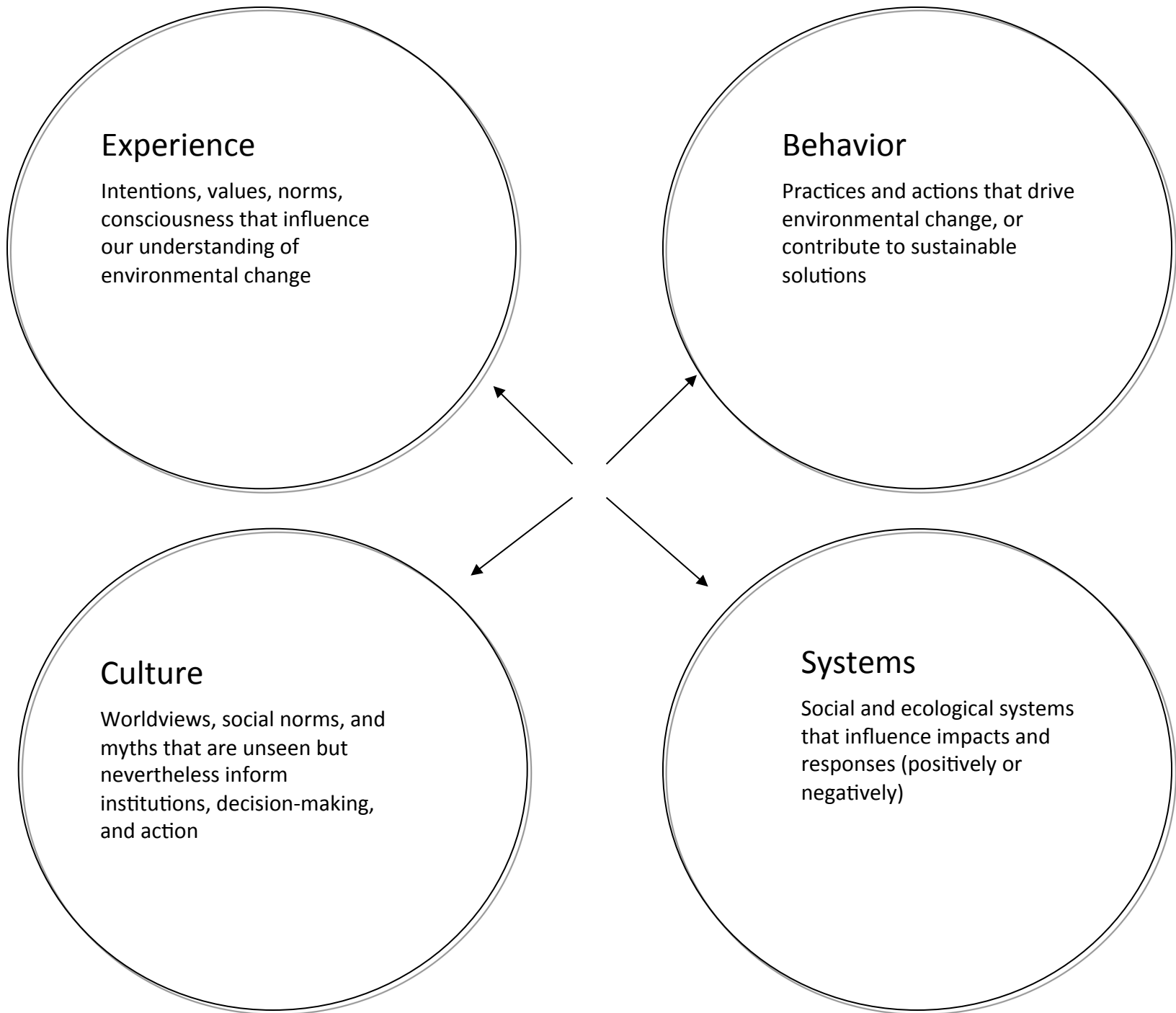


**Fig. 1 – The knowledge arena: sustainability science as a collective learning process.**

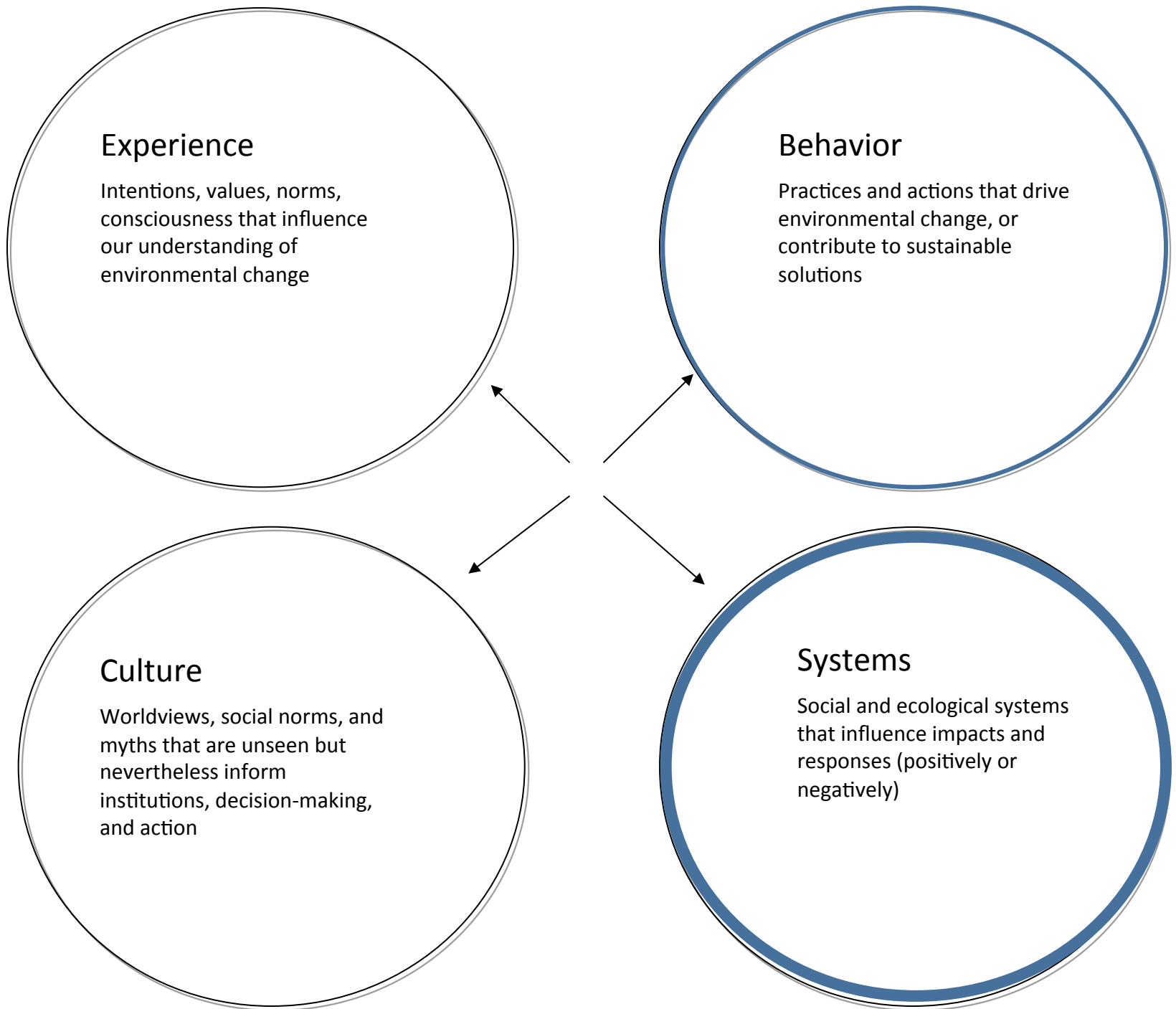
Knowledge-Action Networks are collaborative frameworks that facilitate highly integrative sustainability research. Their aim is to generate the multifaceted knowledge needed to inform solutions for complex societal issues.

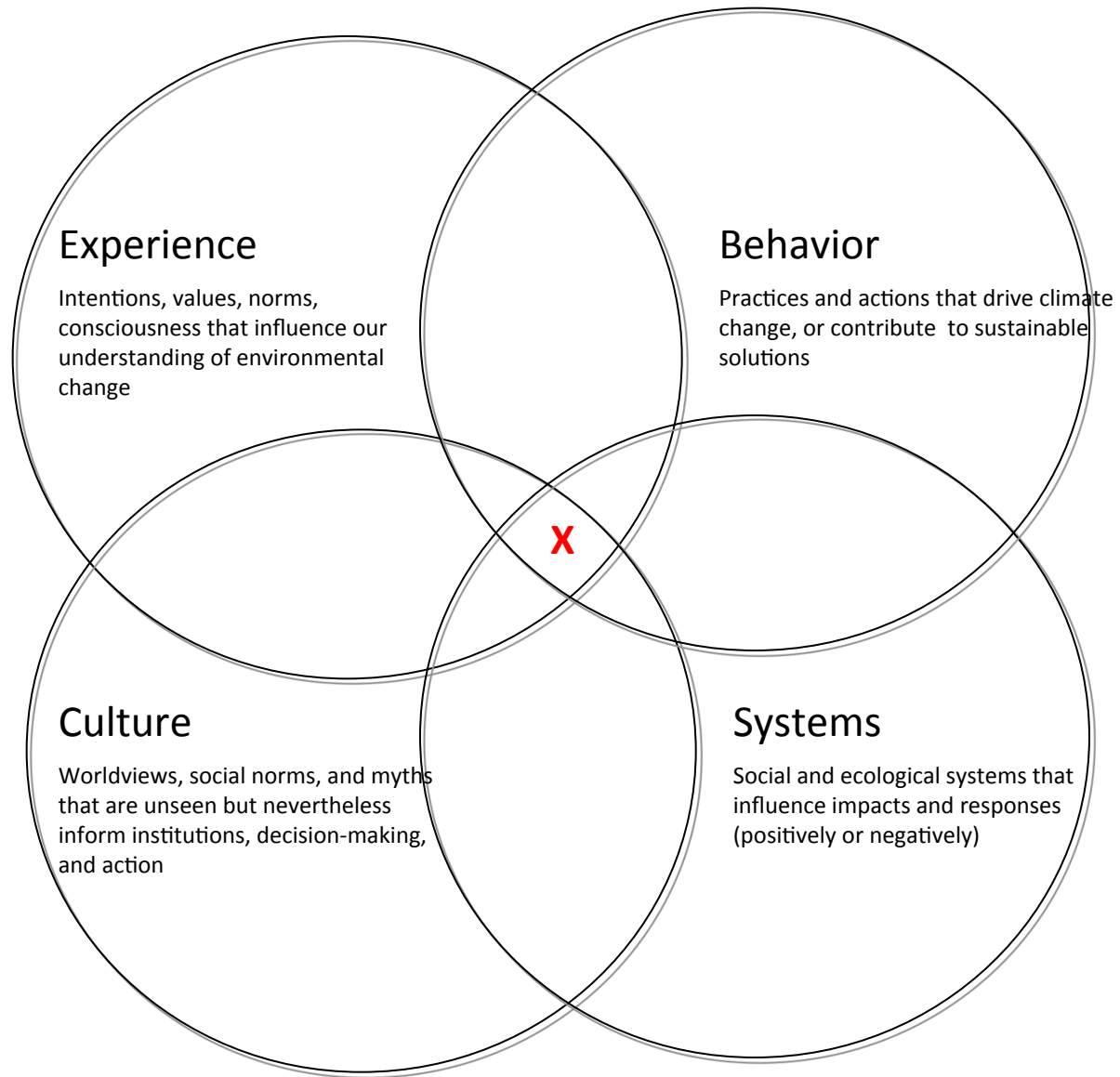
# Many fields and disciplines generate knowledge on transformations

- Socio-ecological resilience
- Social practice theory
- Socio-technical transitions
- Behavioral psychology
- Behavioral economics
- Organizational and institutional change
- Linguistics, narratives, metaphors
- Innovation research (social and technological)
- Globalization research and cultural studies
- Personal transformation
- Social theories on power, politics, social movements
- Creative arts
- Religion and spirituality
- Earth system dynamics
- ...

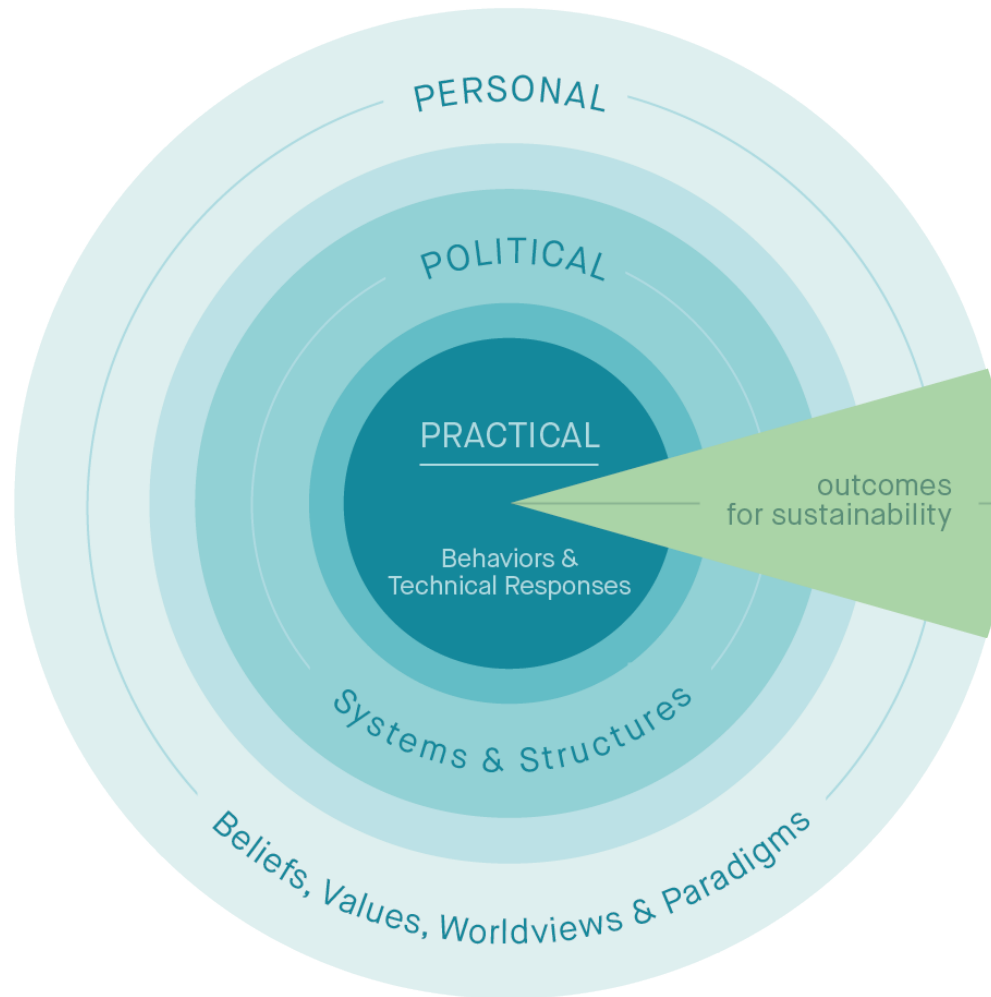








# The Three Spheres of Transformation



# PRACTICAL SPHERE

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- More use of public transport
- More solar and wind energy
- More bicycles
- Recycling
- Less meat consumption

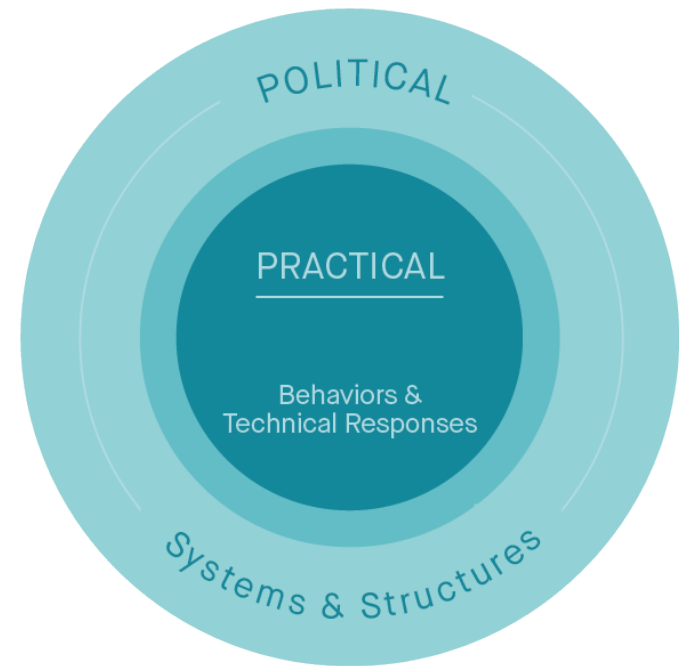




# POLITICAL SPHERE

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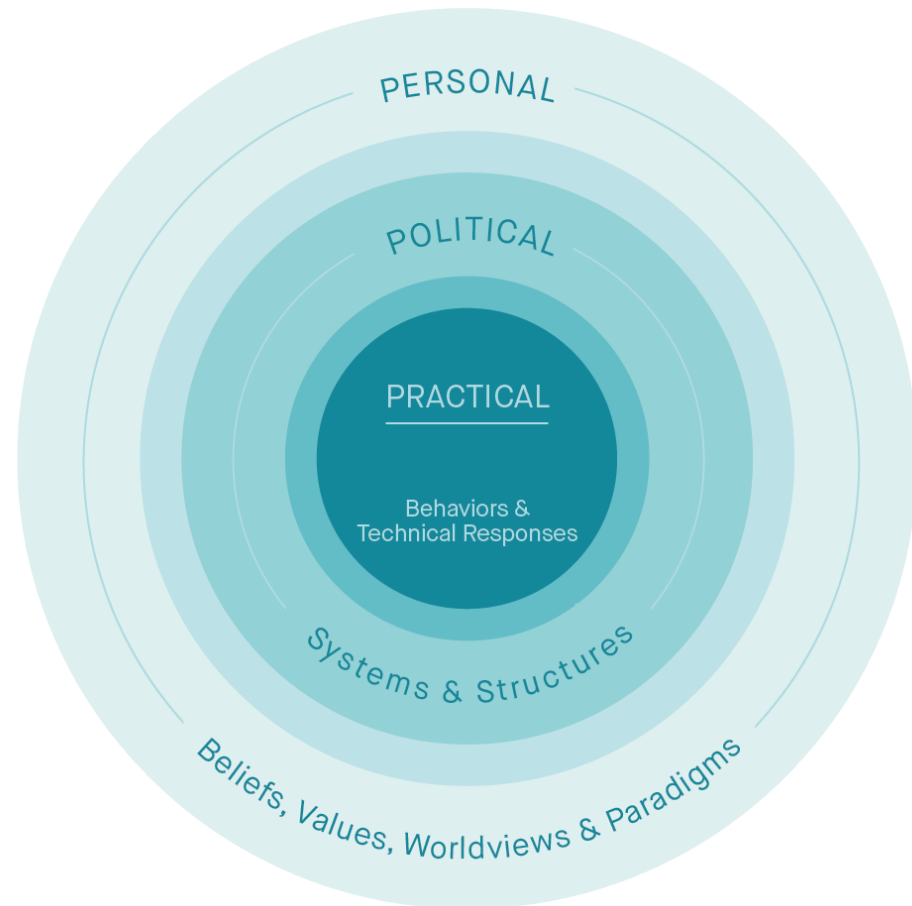
- Norms, rules and regulations
- Insurance systems
- Collective agreements
- Gender relations
- Financial incentives

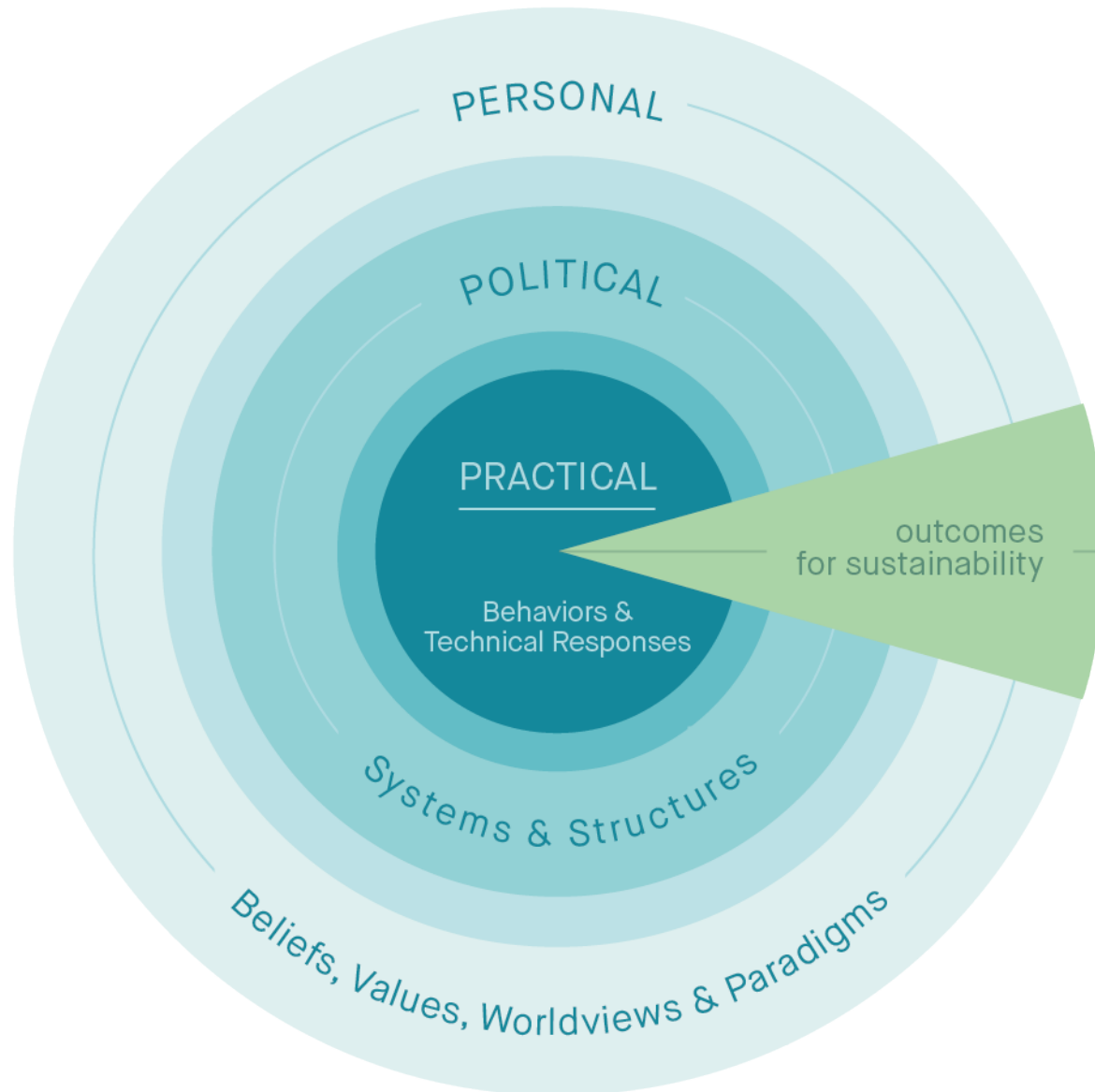


# PERSONAL SPHERE

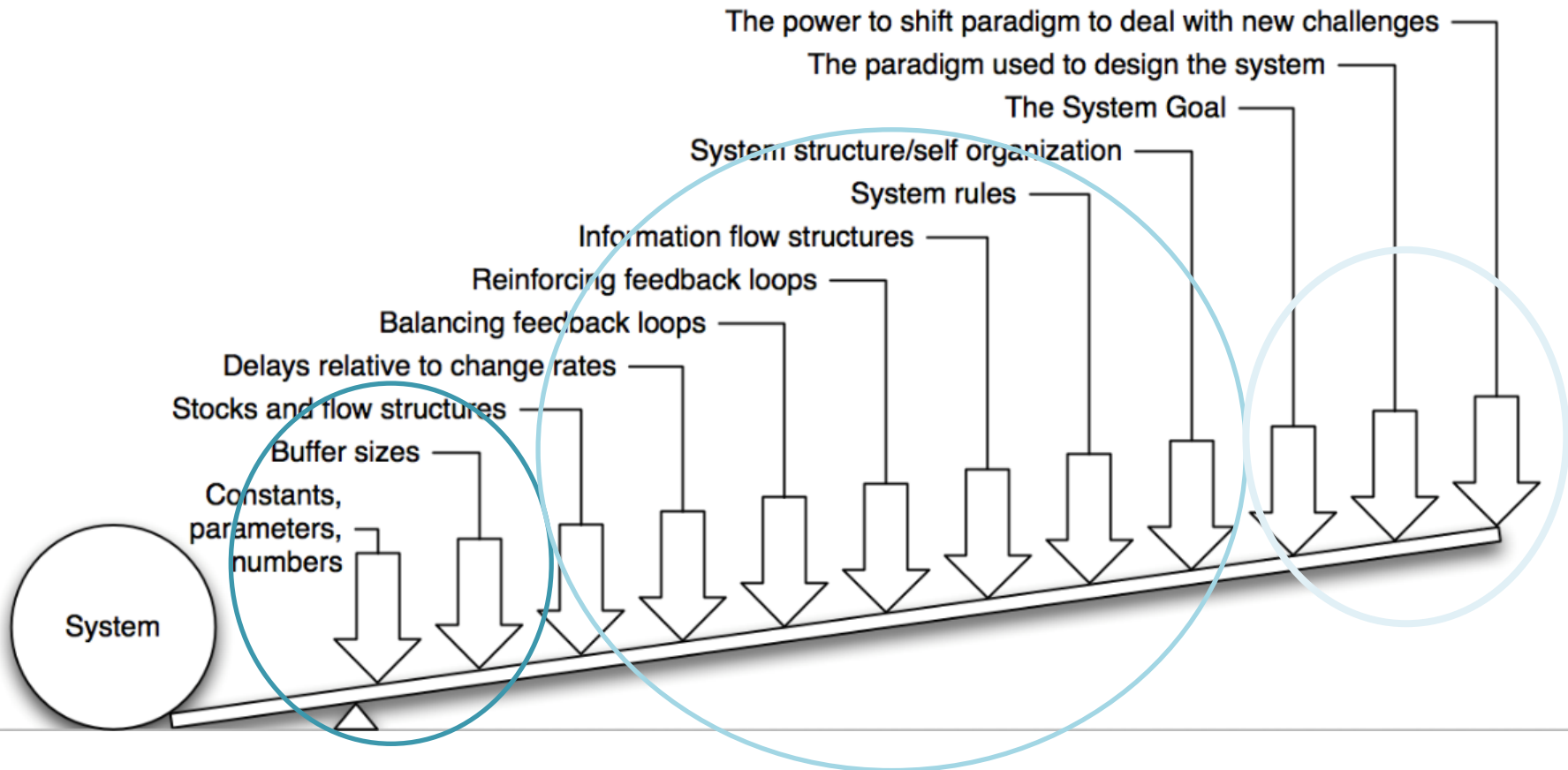
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- Beliefs and understandings of causality
- Types of knowledge considered legitimate
- Goals of development
- Assumptions about leadership





# Leverage Points for Systems Change

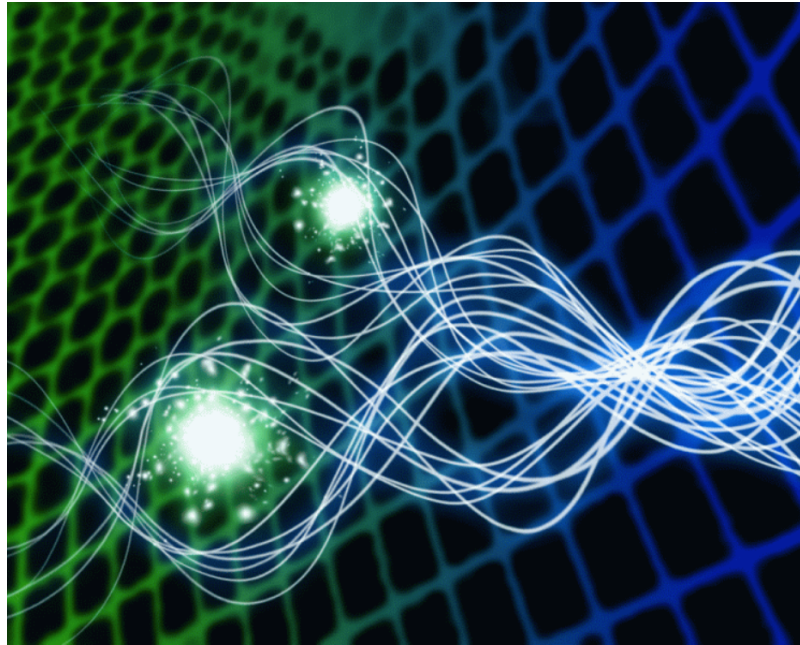




## ***Is it time to think beyond the classical, Newtonian paradigm?***

- Humans are completely material and mental states are nothing but brain states (consciousness as an illusion or epiphenomena)
- No role for experience, meaning, or purpose (which depend on consciousness)
- No free will (choice as an illusion)
- Humans are individual, i.e. biologically and mentally separate (subject-object dualism, nature as separate)
- Humans as machines or zombies (determinism)

***What if these assumptions are wrong?***

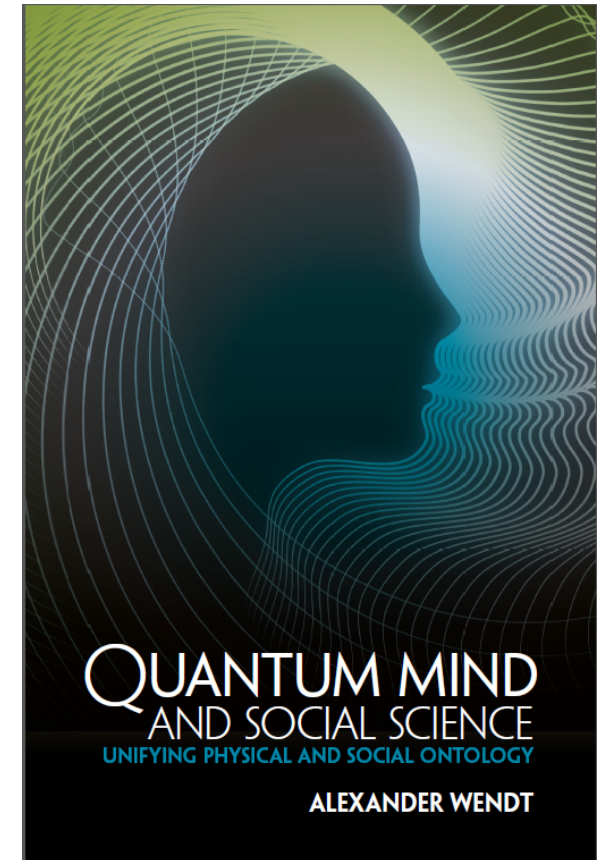
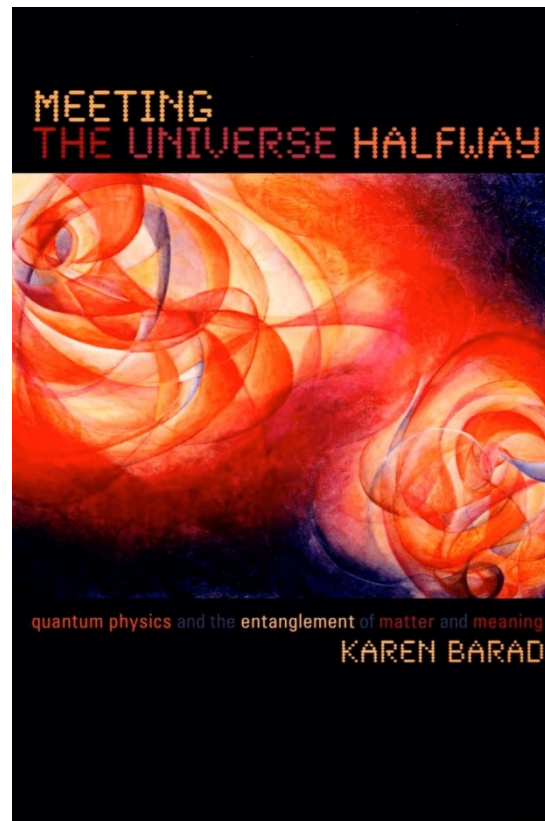
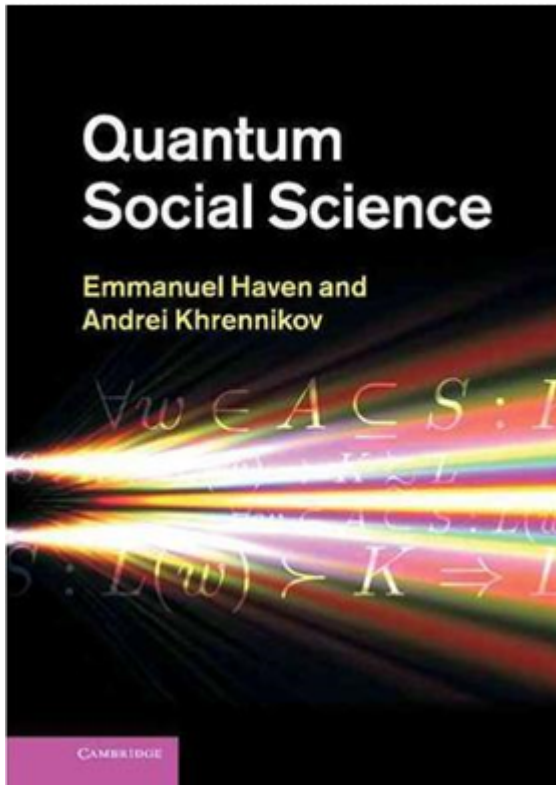


“Quantum mechanics forced physicists to reshape their ideas of reality, to rethink the nature of things at the deepest level, and to revise their concepts of position and speed, as well as their notions of cause and effect.” (Kleppner and Jackiw, 2000)



“If human beings really are quantum, then classical social science is essentially founded on a mistake, and social life will therefore *require* a quantum framework for its proper understanding.” (Wendt 2015)

(Wendt, A. 2015. *Quantum Mind and Social Science*. Cambridge University Press)



# METHODOLOGICAL SIGNIFICANCE

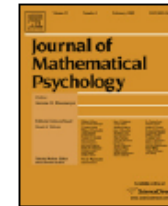
Journal of Mathematical Psychology 53 (2009) 423–433



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## Empirical comparison of Markov and quantum models of decision making<sup>☆</sup>

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<sup>b</sup> Ohio State University, United States

<sup>c</sup> PSE Paris School of Economics

## Quantum Games and Quantum Strategies

Jens Eisert<sup>1</sup>, Martin Wilkens<sup>1</sup>, and Maciej Lewenstein<sup>2</sup>

(1) *Institut für Physik, Universität Potsdam, 14469 Potsdam, Germany*

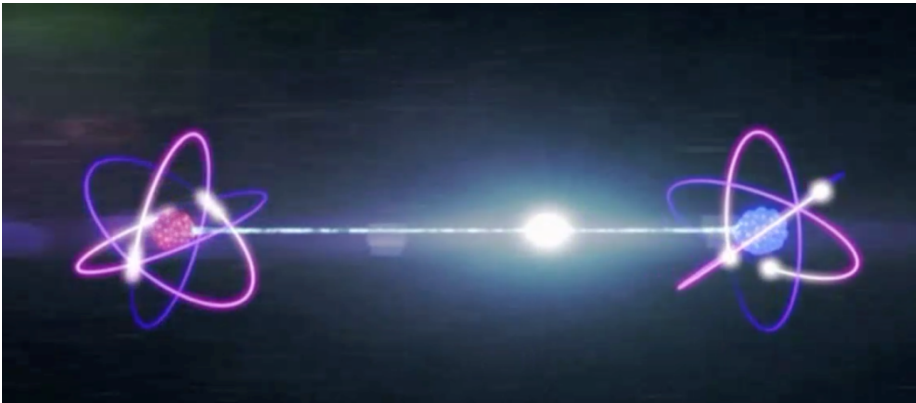
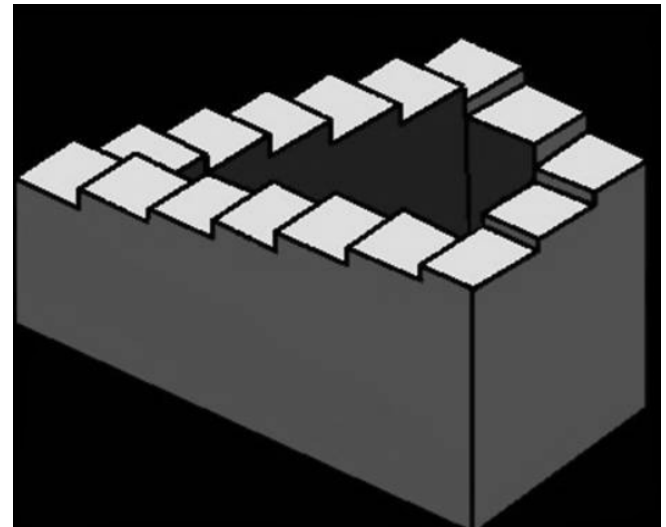
(2) *Institut für Theoretische Physik, Universität Hannover, 30167 Hannover, Germany*

(February 1, 2008)

We investigate the quantization of non-zero sum games. For the particular case of the Prisoners' Dilemma we show that this game ceases to pose a dilemma if quantum strategies are allowed for. We also construct a particular quantum strategy which always gives reward if played against any classical strategy.



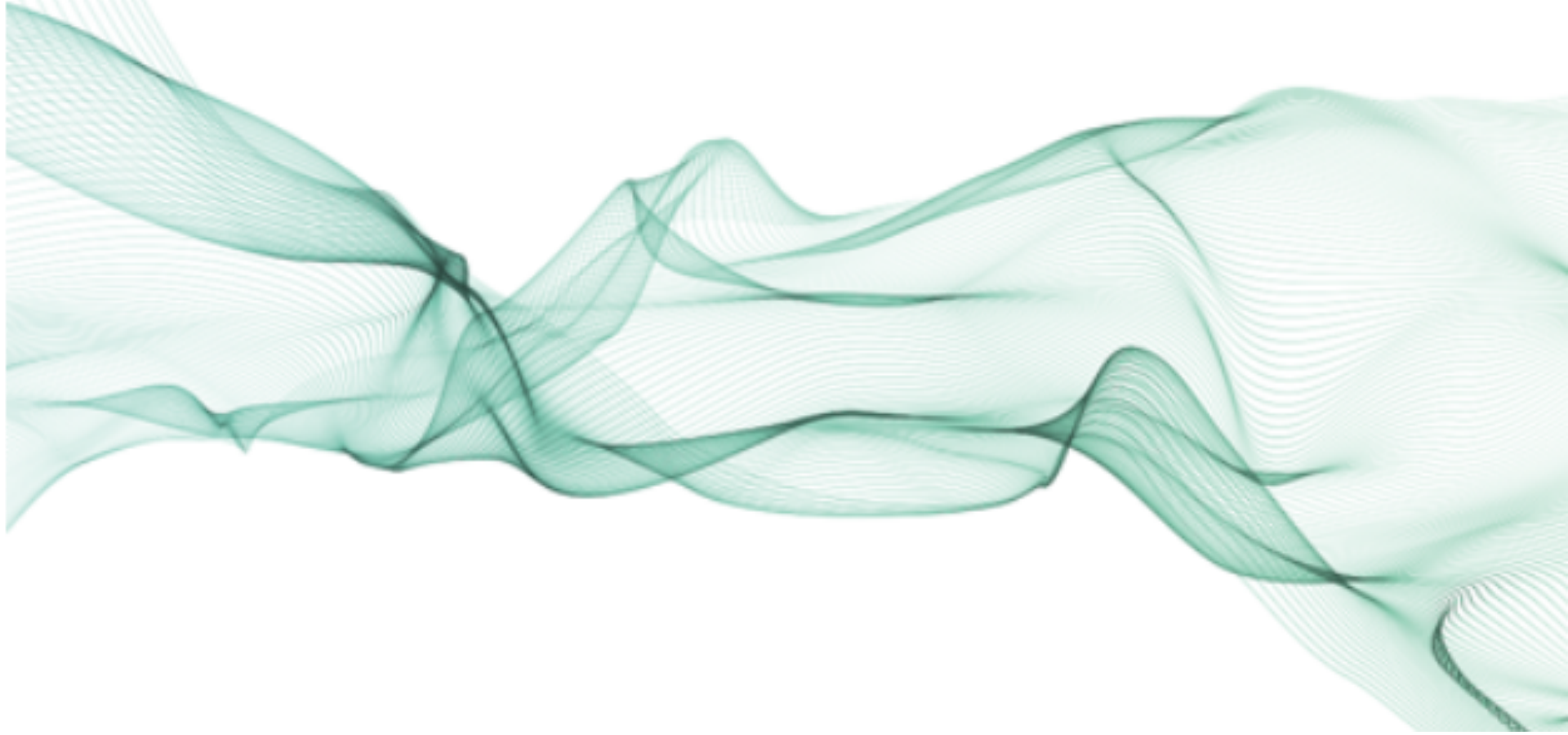
# METAPHORICAL SIGNIFICANCE





# MEANINGFUL SIGNIFICANCE





If we take climate change seriously,  
we should also take transformation  
seriously.