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## Panel 5. Quantum social science, reflexivity and STS: Engaging with agential realism and other reals

Convenor:

Robert Braun, Institut für Höhere Studien, Wien

**Keywords: One-World World; Reality enactment; Quantum Social Theory; Agential realism**

One of the core concerns of STS is to reflect on how specific methods – understood here more broadly than research methods of the social sciences – enact both representations and realities; how technoscience enacts worlds that are appropriate for its routinized practices (Law 2008). This is also reflected in Heisenberg's dictum on quantum theory, that "we have to remember that what we observe is not nature in itself but nature exposed to our method of questioning" (Heisenberg 1958, 58).

Most of social science (and, tacitly, our mundane lifeworld performances) are represented and are enacted as Cartesian/Newtonian real: fixed, particle like entities interact at specific speeds, rhythms; enact spatiotemporally fixed socialities, all of which are observed from the observation deck of the (potentially) all-knowing subject.

Quantum theory (Barad 2007; Wallace 2010; Carroll 2019), applied to the socionatural (Arias- Maldonado 2015) or naturecultural (Barad 2012), challenges Cartesian dualism and Newtonian causality and a determinism on which our imaginary of the social (and physical) world are based (Wendt 2015). This session aims to bring quantum (inspired) ontological sensitivity ((Woolgar and Lezaun 2013) to attend to the "politics of how" (Law and Joks 2019) beyond physics; or put differently: experiment with alternative representations and enactments of the (socionaturally) real.

Quantum social science is an emerging field in the social sciences and in STS, addressing questions in international relations (Fierke and Mackay 2020); economics (Orrell 2018); decision theory and the mind (Wendt 2015); responsible research and innovation (Braun 2024), to name a few. Strangely, there has been little engagement with quantum ontology as a radically reflexive ontopolitical approach in STS.

All ontology, Johanna Oksala (2010) has argued, is "politics that has forgotten itself." This session aims to address transformative forgetting by engaging with alternative ontopolitical sensitivities: what and whose politics has been forgotten, why and for what end, what is the politics of such forgetting and how and what could be remembered, or not, otherwise? We invite contributions that address questions of technoscience or, more broadly, STS with an alternative enactment and method of constituting and instituting reals. We are open to approaches that bring agential realism, quantum social science, indigenous ontologies to call tacit assumptions of a Cartesian Newtonian real into question and address looming ontological questions ('ontology' here understood not as metaphysics but as mundane enactment of reals) of the socionatural or naturecultural otherwise.

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## ID 187 - AI and the ambiguity of the pharmakon. Re-imagining onto-epistemological approaches through quantum social theory

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**Keywords: Quantum social theory, ethics, artificial Intelligence, ontologies, methodologies**

Analytical frameworks that portray humans as the master of a world that is causally simple, amenable to be understood through mechanical models and that can be governed by planning rationalities are inadequate to understand and address AI. Isabel Stenger notes the aversion of the Western philosophical tradition to uncertainty and ambiguity, an aversion that started with Platonism's pushback against the Sophists. Stenger argues we still live in Platonic times. AI challenges this quest for certainty. AI embodies



the ambiguity of the pharmakon, which has been defined by Isabel Stenger as a drug that "can mutate into its opposite, depending on the dose, the circumstances, or the context, it is a drug whose action provides no guarantee, defines no fixed point of reference that would allow us to recognize and understand its effects with some reassurance."

AI cannot be addressed as an "object" that can be separated and disentangled from our way of life. It is embedded with an increasing number of aspects of our existence, with outcomes that are inevitably unstable and ambiguous. AI is designed by humans, but in turn, it contributes to shaping the way humans live. AI is also rapidly changing and evolving in its capabilities and fields of application. Newtonian onto-epistemologies, abstract normativity, and the quest for control are not apt to analyze, navigate, and govern its complexities. To engage with AI, we need an ontological and epistemological shift away from frameworks relying on substantialist assumptions, mechanistic causal models, and abstract universal ethical principles.

The recent "relationality turn" in political science and international studies offers insightful conceptual tools in this regard. In embracing deep relationality and uncertainty quantum social science invites analysts to think outside the constraints of Newtonian linear causality, the distinction of subject-object, and mechanical models for how social interactions may be understood. Quantum social theory proposes a worldview that challenges the assumption of separability at the foundation of methodological individualism. It embraces non-linear relations of causality, focuses on change instead of immutable regularities, and acknowledges the need for contextual assessments in policy-making and ethical decisions.

In this paper, I rely on what I have called elsewhere an ethos of practice and on Barad's conceptualization of the performative effects of apparatuses to argue for an alternative onto-methodology for addressing AI. Instead of asking whether AI is good or bad, we need to explore how it is constituted as an ecology of practice, how it relates to other ecologies of practice, and what kind of distributive outcomes it produces in its intra-actions within the different phenomena with which it is differentially entangled.

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## ID 222 - Through the Lens of Quantum Ecology: Holographic Bodies and Inconsistent Agents

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**Keywords:** quantum ecology, quantum information technologies, agency, body, epistemology

Building on works connecting quantum theory to cultural (Barad 2007) and social (Wendt 2015) realms, in their book Calzati and de Kerckhove (2024) identify three ecologies: linguistic, digital, and quantum. Through an intra- and inter-ecological analysis inscribed along the axis connecting oral communication, writing systems, and data technologies, the authors outline a framework that helps better understand our (technologized) contemporaneity and navigate the impact of quantum information technologies (QITs). Hence, the quantum ecology is conceptualized as both an onto-epistemological framework – based on key principles and phenomena of quantum physics – and a technological paradigm – pivoting around QITs – which will redefine "world-sensing", alongside and in contrast with the other ecologies.

Here I further expand on Calzati and de Kerckhove's work in two complementary ways which directly tie to the idea of "technoscience for good" through the recognition of alternative ontopolitical sensitivities. To do so, I will discuss a fourth ecology – of the body – to which the authors refer when speaking of "embodiment", but do not systematize.

As the inescapable ecology of all living beings, the body is, at once, compass and root of experience (Frank et al 2024). This means, referring to the authors' terminology, that the body is an organic "information-processing dispositif" (cf. Bateson, 2000). From this perspective, it is the whole concept of meaning to get reconfigured as not much a semantic referent, but an always-in-the-making process of sensing/valuing the world: "in a way," Atmanspacher (2020) writes, "the experience of meaning can thus be understood as a ('sixth') sense modality for 'perceiving' psychophysical correlations." This, in turn, triggers a redefinition of the body too, not much as a monad, but as a holographic instantiation that encapsulates and refracts



the collective, reworking biological, cultural, and artificial boundaries.

On the one hand, this opens the door to a discussion on (human and more-than-human) agency beyond objectivism to accommodate, instead, an autopoietic (cf. Kauffman, 2019) dispositif-dependent framing for which the quantum ecology can prove fruitful. Agency, accordingly, emerges and is enacted as a decomposed, yet unitary, dimension – a dimension that, while being whole, can host internal inconsistency, both intra-ecologically as well as inter-ecologically. The self as a privileged "point-of-being" (de Kerckhove & de Almeida 2014) gets defused, diffused, and transfixed, demanding, first, the recognition of ecology-dependent onto-epistemological pluralities and, second, an exercise of responsibility and balance toward such pluralities.

On the other hand, through pervasive computing humans are "enveloping" (Floridi 2019) complex reality altogether into a rational-efficient scenario. In so doing, however, they impose on themselves such behavioral constraints that these make eventually explode humans' agential inconsistencies beyond the "rational subject". Effects such as electromagnetic sensitivity can be regarded as psychophysical responses to the engineering of capillary "observership" (Hertog 2023) into today's all-encompassing networks and infrastructures. Likely, this kind of sensitivities will multiply alongside the consolidation of QITs, as forms of diffraction in the sociocultural realm of the onto-epistemological complementarity between position and momentum, i.e., one's own identification (as tracking) and one's own movement (as becoming).

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## ID 283 - Quantum Technology, Global Power Politics, and the Social Construction of Technological Dominance

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**Keywords: Geopolitical, Scientific, realism, critical reflexive**

Scientific breakthroughs do not solely determine the development and deployment of Quantum Technology (QT) but are deeply embedded in social, political, cultural, and economic contexts. This aligns with the Social Construction of Technology (SCOT) framework within Science and Technology Studies (STS), which argues that technological advancements are not inevitable or linear but somewhat shaped by social groups, power dynamics, and competing interests (Pinch & Bijker, 1984). From the SCOT perspective, QT does not develop in isolation but is co-constructed through the interactions of key stakeholders, including governments, military institutions, corporations, and scientific communities. Each actor frames QT in ways that align with their strategic goals, whether for national security, economic competitiveness, or scientific prestige. The competition between China, the United States, and the European Union over quantum supremacy exemplifies how geopolitical rivalries influence technological trajectories, reinforcing the argument that technology is a socially constructed phenomenon rather than a purely technical evolution. This paper also addresses the politics of quantum technology, situating its development within the broader landscape of global power dynamics. The "quantum race," driven by nations and corporations vying for supremacy, reflects political ontology enactment that prioritizes specific values, realities, and futures while marginalizing others. Building on (Law & Joks, 2019), this work examines how the politics of quantum technology enact specific realities and explores alternative enactments that incorporate indigenous ontologies or relational epistemologies, resonating with the interconnectedness central to agential realism. By linking quantum technologies to the emerging fields of quantum social science (Wendt, 2015b) and Science Technology and Society (STS), this study seeks to expand the scope of critical reflexive inquiry into the socio-natural and nature-cultural realms. It argues for a critical engagement with quantum ontologies, emphasizing their potential to transform the technologies and the political, ethical, and epistemological frameworks through which technoscience operates.



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## ID 363 - Quantum Ontology and STS: A Methodological Analysis

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**Keywords: Quantum ontology, STS methodology, by analogy, really, agential realism**

In recent years, the field of quantum social sciences and humanities has been expanding more and more (Voelkner and Zanotti, 2022, 1). Nevertheless, Braun observes that interactions with quantum ontology as an ontopolitical method have been limited in the context of STS (Braun, STS panel proposal, 2025).

Here, it is asserted that, before considering quantum physics in relation to quantum social sciences and humanities – specifically STS –, it is necessary to conduct a particular methodological analysis to determine how STS and other disciplines that study real-world objects are impacted by quantum mechanics. Bottom of Form More precisely, analysing whether using quantum ontology 'by analogy' or 'really' (O'Brien, 2016) is considered. It is further shown how the proposed analysis connects to the debate around whether quantum physics concerns only the micro-world or is also valid for the macro-world. In support of the latter, an analysis is presented of De Freitas' position, for whom '[a]ccording to Barad, the existence of radically different scales of being (the quantum or the galactic) does not limit quantum insights into the everyday life of humans. Contrary to the usual way we approach this topic, she emphasizes that there are not two domains (the microscopic and the macroscopic) with two different ontological principles. Thus, she claims that quantum ontology is directly (and not simply analogically) relevant to everyday matters' (De Freitas, 2017, 3). Together with this, as to the 'by analogy' perspective, works such as those by Haven and Khrennikov are examined. Issues raised by the authors, like the assertion that their 'statistical approach does not assume that quantum physical effects are really part of the social world' (O'Brien, 2016, 621), are considered. In this regard, Slaton's viewpoint – namely that '[q]uantum physics will be applied throughout this chapter as a metaphor that can offer insights, hypotheses, and alternative explanations for political phenomena that have been studied since ancient Greece. While I am intrigued by the work of those who apply quantum theory more literally, as a social science theorist (not a physicist), I feel more comfortable using this new information as an instrument to help me approach the study of participatory democracy without the constraints of a science seeking predictability and determinism' – is also analysed (Slaton in Becker, 1991, 42). As for taking quantum physics into account 'really', Barad's argument is examined. Specifically, their position that 'applying quantum physics to the social world by drawing analogies between tiny particles and people' would correspond to an oversimplified misapplication of both theory and practice is taken into account (De Freitas, 2017, 3; Barad, 2012a, 17). It is additionally seen how the reason why analogies between the two spheres are avoided is that Barad does not believe that isolated realms of reality exist at all (Ibid.). It is also investigated how considering humans as 'walking wave functions' can be further associated with this approach (Der Derian and Wendt, 2022, 15).

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## ID 436 - Entangled realities: A case for reimagining past and present of agriculture

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**Keywords: Agricultural innovation, Entangled realities, Lyseology, Re-peasantization, Food systems**

With the discovery of archeological sites bearing first signs of domesticated wheat in the region dubbed as the 'Fertile Crescent', popular historians have linked emergence of civilizations to agricultural surplus (Diamond, 2005; Harari, 2015). This to them is the 'natural' process of subsistence intensification under suitable natural conditions. They also caution that agrarian landscapes come with exploitative social institutions such as private property, surplus accumulation, inequality, and colonialism. Given this linear path dependent trajectory of human history, to sustain the global human population (predicted to be 9 billion strong by 2050) the predominantly imagined future of food is to improve upon these agricultural princi-



ples and endure its maladaptive social and environmental externalities (Grunwald, 2024). However, it has been argued that this narrative is constructed on cherry-picked archeological evidence, fitted around ideas of social theorists such as John Locke and Rousseau, and often used as the ethical basis for colonial capture of indigenous lands (Graeber & Wengrow, 2022). It is also the basis for modern agricultural science to promote their innovations as solutions to a lack of productivity or resource efficiency- an approach termed as "lyseology" within critical innovation systems research (Braun, 2024, p.2). This lyseology has been applied in the colonial (Pouchepadass, 1995), as well as post-war agricultural research and policies (Kumar, 2016). Even though the critiques of modern capitalist food regimes have called for epistemic shifts in agricultural knowledge, with inclusion of indigenous modes of understanding the food system (McMichael, 2009) or democratizing local decision making (Ody & Shattuck, 2023), they in general do not question this lyseology. By looking at agriculture as the entanglement of nature-culture (Barad, 2012) frees us from the linear understanding of agriculture as a natural process forming the structure for exploitative socio-ecological systems developed by human actors. This stance allows us to study the 'intra-active' processes of biotic and abiotic stressors that affect food production, consumption practices, nutritional cycles mediated by waste and excreta, as well as the money-flows that are carried out within the supply chain. This paper uses this reading of agriculture to highlight how different political engagements for re-peasantization tries to resist techno-optimistic lyseology of agricultural science and shows the way out of linear narratives of agriculture and society.

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## ID 703 - Quantum Metaphysics and the Ontological Turn

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**Keywords:** Anthropocene, apparatuses, political ontology

The "ontological turn" is not a unidirectional turn but a plurality of turns. One has been a turn towards developing alternative ontologies of the (ostensibly singular) world that "we all,"—all-of-us, human and more than human—inhabit. Whatever the differences in substantive details, these are traditional ontologies in that claims regarding what "reality," "Being," "the real" might be, are arrived at through metaphysical reasoning.

Another thread within this turn has been a turn away from metaphysics to examining how "reality," "Being," "the real" are constituted and reproduced. No longer is there one world out-there which it is the task of metaphysics to somehow get right in its ontological details. Rather there are many worlds, or, said ontologically, many ontologies. Examples are ontologies that do not distinguish between a world out-there ("nature") and a subject in-here, amongst which are Zen and Tibetan Buddhism; or indigenous ontologies that do not distinguish between humans and animals, or consider what we call "animals" to be humans too, or consider land, nature, as something they belong to rather than something they can own. That we have reports of these other worlds, other ontologies, raises the question for the occidentals amongst us of whether we can in some existential sense do more than simply write about alternative ontologies.

Edmund Husserl in *The Crisis of European Sciences and Transcendental Phenomenology* wrote: "the total phenomenological attitude and the epochē belonging to it are destined in essence to effect, at first, a complete personal transformation, comparable in the beginning to a religious conversion." Martin Heidegger after reading a book on Zen Buddhism by D. T. Suzuki, is reported to have said: "If I understand this man [Suzuki] correctly, this is what I have always tried to say in all of my writings." Timothy Leary, in *The Politics of Ecstasy*, wrote that after ingesting sacred mushrooms for the first time, he felt like he had woken up from a "deep ontological sleep." Leary's onetime colleague, Richard Alpert, said while reflecting on his time in the Department of Social Relations at Harvard University, that: "We used to believe that if something couldn't be measured it wasn't real. As you can imagine, we lived in a very puny universe."

Non-realist quantum ontologies similarly point to alternative worlds. Equally important, they have created an ontological space that is located simultaneously within and outside the Newtonian-Cartesian ontology that has expanded across much of the planet, from which location several questions can be asked: What



is that world? What is it like to live in that world? How and by whom and by what was this ontology constituted? Answers to these questions require attending to ontopower, the politics of ontology: the classification and naming of binaries, of entities and of non-entities, signifieds and signifiers, the real and the unreal, true and false. This is the political ontology of what has been named "the Anthropocene." This paper examines how this ontocratic order is constituted and reproduced within the technoscientific apparatuses of Anthropos.

