

**Quantum Mechanisms:  
Expanding the Boundaries of Power, Space, and Time in Global Security Studies**

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This inaugural issue of the *Journal of Global Security Studies* stakes out important new frontiers in security studies, pushing the boundaries of the possible in power politics (Goddard and Nexon), space (Adamson), and time (Ward). Goddard and Nexon attempt to wrest global security studies away from the traditional IR perspective of states as primary actors acting within the structure of anarchy; Adamson calls for a “spatial turn” in IR, drawing attention to geographies that challenge the dominant conception of the world as a set of territorially-defined entities; and Ward challenges the field to move beyond description and prescription. Instead, they offer a broad, pluralistic view that focuses attention on collective mobilization processes rather than covering laws, erases boundaries between states, and promotes prediction as a goal for theories. However, expanding the boundaries of power, space, and time in global security studies cannot be fully realized within traditional IR philosophies of science. To reap these benefits requires a rejection of the traditional neo-Newtonian view of mechanisms in favor of a quantum mechanical perspective.

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Ward begins with a discussion of the Antikythera mechanism, constructed to predict future events based on the Ancient Greek (pre-Keplerian) understanding of the motion of celestial bodies. The use of this (literal) mechanism as a starting place for discussing predictions in political science is quite apt, in that social science is still stuck with a neo-Newtonian conception of mechanisms for both prediction and explanation. Jon Elster aptly describes this orthodoxy in his paean to methodological individualism: “To explain is to provide a *mechanism*, to open up the black box and show the nuts and bolts, the cogs and wheels, the desires and beliefs that generate the aggregate outcomes.” (emphasis in original; Elster 1985, 5). For Elster, as for many in social science, mechanisms are simply micro versions of covering laws, in which knowledge is obtained through drilling ever further downwards, explaining ever smaller and smaller interactions during vanishingly small time spans.

This notion of mechanisms as micro-foundations for laws is a common neo-Newtonian trap; even those who seek to escape it just end back where they started.<sup>1</sup> Goddard and Nexon seek a way out of this trap, equating the study of power politics with the study of “mechanisms of collective mobilization—the causal and constitutive pathways linking efforts at mobilization with enhanced power.”<sup>2</sup> Yet this definition is hamstrung by the IR tradition of separating causal from constitutive mechanisms. As some (Wendt 1998; Kurki 2007; Jackson 2011) have observed, causal mechanisms are typically a form of ‘explaining’ in which the goal is to ultimately refer to covering laws, whereas ‘understanding’ refers to constitutive approaches that answer how-possible or why questions. As Wendt (1998) succinctly put it, saying that X ‘causes’ Y requires “1) that X and Y exist independent of each other, 2) that X precedes Y in time, and 3) that but for X, Y would not have occurred.” (105) Constitutive accounts, on the other hand, reject the first two but agree on the third. Goddard and Nexon (and Adamson) are clearly committed to including relational-

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<sup>1</sup> For example, Jackson (2011, 108-9) points out that George and Bennett’s canonical (2005) text urges that scholars look for mechanisms rather than laws... and then promptly links those same mechanisms right back to general laws.

<sup>2</sup> At times, the temptation to generalize appears to be too great: “We wager that these mechanisms of collective mobilization potentially operate regardless of the specific actors that practice power politics—states, transnational actors, or whatever.” (Goddard and Nexon)

processual approaches to international politics, which decidedly fall on the constitutive side of the causal/constitutive divide.<sup>3</sup>

Yet in order to have a truly broad notion of global security studies, we must abandon the distinction between ‘causal’ and ‘constitutive’ mechanisms. As Kurki notes, “Many critical realists, including this author, prefer to avoid the use of the metaphor mechanism precisely because of its mechanistic connotations.” (Kurki 2007, 365n18). The way out of this neo-Newtonian trap is through abandoning the “mechanistic” view of social scientific mechanisms as *independent* and *time-ordered* cogs and gears pushing on each other to translate inputs into outputs. This Newtonian view of causes was abandoned nearly a century ago in physics through the quantum mechanical revolution, which threw out Wendt’s first two criteria for causes: independent existence and time precedence. There is no need for social science to cling to this metaphor in the present day given that the physicists gave it up a long time ago.<sup>4</sup>

This is hardly a radical idea, as major research programs have already demonstrated the benefits of abandoning these criteria. Network analysis has called our attention to the interdependence of units and their simultaneous interactions (Hoff and Ward 2004; Hafner-Burton, Kahler, and Montgomery 2009) and has even given us good tools for estimation that assume neither independence nor time-ordering (Cranmer and Desmarais 2011; Krivitsky and Handcock 2008; Ripley, Snijders, and Preciado 2012),<sup>5</sup> while the constructivist turn in IR since the 1990s has illuminated the power of constitutive rather than causal explanations (Katzenstein 1996; Wendt 1999). It is long past time to abandon an exclusive focus on covering laws and instead simply require that explanations describe generative processes that demonstrate that “but for X, Y would not have occurred.”

Eliminating the causal/constitutive divide does not invalidate explanations that rely on ‘causal’ mechanisms any more than moving beyond Newtonian physics led airplanes to drop from the sky or the planets to stop orbiting the sun. The implication of this move to a quantum mechanical one is, rather, to simply erase the artificial distinction between causal and constitutive and focus on mechanisms regardless of their time-ordering or independence.<sup>6</sup> Indeed, rejecting the causal/constitutive mechanism divide clearly complements Goddard and Nexon’s explicit rejection of a “rigid ontological distinction” between processes and mechanisms (n12).

However, not all traditional analytic distinctions need to be erased in order to have a big-tent approach to global security studies. For example, there does need to be some way to distinguish “global” politics from other politics, unless the only purpose is to delineate aliens and meteorites from everything else. While Goddard and Nexon mainly focus on defining power politics as mechanisms and processes and distinguishing “businesses and bureaucracies” from other forms of collective mobilization, they leave open the question of what ‘global’ should be. In accordance with adopting a quantum perspective (which in

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<sup>3</sup> “The study of the dynamics of power politics thus finds kinship with calls to take practices, transactions, and relations themselves as basic units of analysis” (Goddard and Nexon). They also adopt Jackson and Nexon’s definition of mechanisms, “delimited sorts of events that change relations among specified sets of elements...” (1999, 302)

<sup>4</sup> If social science is going to be serious about its physics envy, we might as well adopt recent rather than ancient metaphors.

<sup>5</sup> Interestingly, models that model simultaneity of choices (TERGMs) appear to be superior to stochastic actor-oriented models (SAOMs) at prediction (Cranmer and Leifeld 2014).

<sup>6</sup> A more extreme measure would be to shift not just metaphors but entire ontologies to quantum mechanics (Wendt 2015).

physics erases boundaries between particles), the global could be defined as a mode of analysis that incorporates *processes* that cross or deny national boundaries. This definition has the benefit of including Adamson's transgressive spaces and further refining Goddard and Nexon's emphasis on mobilization processes by focusing on trans-boundary analysis of those processes. To be more concrete as to what is or is not global: it is entirely possible to analyze, say, Ferguson *locally* as race (which would constitute a security studies analysis without being global), but it is also possible to analyze it *globally* as the domestic repercussions of militarized policing connected to counterinsurgency. I thus agree with Carpenter (this issue) that localized security issues are global—but only if they are analyzed as part of globalized processes.

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The neo-Newtonian trap goes beyond independence and time-ordering; it also reifies the notion of *individual* units that are *territorially discrete*. Regarding the former, Elster's methodological individualism all too quickly slips into ontology. Rather than rational, unitary, individual actors being a convenient assumption, they are instead taken as fundamental truths. Adamson notes that the same danger lurks with methodological nationalism, which reifies the traditional spaces of security studies: methodological nationalism quickly becomes ontological nationalism. Adamson's challenge by way of a proposed "spatial turn"<sup>7</sup> thus nicely complements Goddard and Nexon's critique of the state as the main unit of international politics by identifying spaces that are venues for security politics while bearing little resemblance to traditional territorially contiguous units. Just as quantum mechanics discards the notion of particles existing in discrete places and times, Adamson argues that global politics transcends notions of discrete states interacting in favor of an analysis that can conceive of spaces (global cities, cyberspace, and the global polity) that cross or violate boundaries, potentially even existing simultaneously in multiple spaces or even, like quantum states, acting at a distance.

This is a less radical perspective than it sounds: here, too, there are some links with contemporary quantitative work in network analysis. Spatial dependencies in data bear some family resemblances to network dependencies, although the latter are much more difficult due to a lack of geographical constraints to keep the data well-behaved.<sup>8</sup> Nonetheless, network dependencies can sometimes be constrained or enabled by particular spatial relationships. Even nominally geography-independent networks are often highly constrained by geographic units (e.g., the Great Firewall of China).

The spatial turn here is thus really a socio-spatial turn or an addendum to the relational turn, with the additional complication that relationship ties take place on top of various substrates, whether the complexity of the global city (with their function as hubs of all kinds, ties to diasporas, and high density of unlike actors),<sup>9</sup> in cyberspace (with its multiple overlapping types of online relationships, some affected by traditional geography, e.g., NSA breaking the internet), or the global polity (including diaspora politics being played out in multiple sites connected through shared senses of identity even in disparate locations). The global polity is a constructed space that recognizes the complex interdependency between global cities, nation states, cyber-space, and even "safe havens" and "ungoverned spaces."<sup>10</sup>

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<sup>7</sup> See also the geographic turn, e.g., Ward and O'Loughlin (2002). At this point, there are so many different turns that I'm starting to get dizzy.

<sup>8</sup> Ward and Gleditsch (2008) as well as Weidmann and Ward (2010) note many similarities.

<sup>9</sup> Except that the distributions are highly dependent upon historical political-geographical relationships (e.g., colonialism).

<sup>10</sup> Safe havens are a major concern for government agencies; e.g., one of DoD's priority objectives for WMD is to "Manage WMD risks emanating from hostile, fragile, or failed states and safe havens" (Department of Defense 2014).

To take a more concrete example of simultaneous action occurring in multiple, geographically disconnected spaces, consider the effects of drone strikes. These simultaneously lead to the ultimate separation of the combatant from the battlefield, the battlefield from a war, and the combatant from civil society—except when all of these contradictions come crashing back together with drone pilots having higher rates of PTSD, foreign non-wars escalating into wars, and the resultant need to engage by putting "boots on the ground." This analysis would also include the return home of COIN equipment and orientations when applied to domestic populations, now re-cast as nascent or actual insurgencies. The connections between these remote locations are problematic for the neo-Newtonian perspective, but they are part and parcel of quantum mechanisms, which allow for the distant, complex dependencies between events envisioned by the global polity perspective.

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While Goddard and Nexon together with Adamson expand the area covered by the big tent of global security studies, Ward is interested in pushing it into the future. His essay is both daring and provocative; it leads us to the bleeding edge of prediction of social phenomena through "Big Data" analysis of automated encoding of news articles worldwide. Yet some of the types of prediction that Ward discusses here are, in many senses, sadly atheoretical. As Gene Rochlin has eloquently noted, what we are moving towards is "...the substitution of data-scanning for information-gathering, of rules and procedures for learning, and of models and calculations for judgment and expertise. In short, the replacement of art with artifice."(Rochlin 1998, xiii)

In particular, Tetlock's Good Judgement Project demonstrates that it is entirely possible to make predictions with little or no actual judgment or expertise regarding the phenomena being predicted. Yet this is in large part due to specificity of the predictions in the project: they are geared towards assessing frequencies of events rather than tapping any fundamental understanding of the events. Sadly, this makes the finding somewhat tautological, since the questions are constructed to be biased in favor of "predictors" over "experts." Ward's example is particularly telling: "Will Iran sign an IAEA Structured Approach document before 1 June 2014?" That predictors would be better is unsurprising because this question requires precisely the kind of things predictors would know (base rates, exceptions, tracking successes, etc.) rather than what experts would know. Tetlock's questions consequently lack mechanisms (both neo-Newtonian and quantum) and are all 'explanation' with no 'understanding.' The fabled Wisdom of Crowds is also the Foolishness of Crowds (or perhaps the Crowd as Idiot Savant), since the answer to this question tells us almost nothing useful. For example, if one were interested in prescription as well as prediction, then the right question would be, "What should the US government do to improve the chances of Iran signing an IAEA Structured Approach document?"—precisely what you need judgment and expertise for.

Yet prediction can be incredibly useful for theory if structured in the right way. We have a lot of "Big Data" being created constantly; what we really need is Big Wisdom as to what to do with it.<sup>11</sup> Ward points to W-ICEWS (World-wide Integrated Crisis Early Warning System), which tests extant social science models of political instability on datasets created through automated coding of news stories. W-ICEWS (unlike Good Judgement or Google Flu<sup>12</sup>) actually attempts to harness the collective wisdom on instability to get somewhere useful, and so goes some way towards meeting Ward's "gold standard" of prediction. Yet prediction is far from the only "gold standard" for theories. Indeed, multiple criteria (including demonstration of mechanisms, experiments, prediction, and prescription) are collectively considered to be the gold standard, at least in the neo-positivistic tradition.<sup>13</sup>

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<sup>11</sup> I thank John Harte for this pithy observation.

<sup>12</sup> See Lazer et al. (2014)

<sup>13</sup> Jackson (2011) argues for a pluralist philosophy of science that includes neo-positivism.

Prediction is inherently stochastic, and this is a good thing. We've (finally) moved past chaos theory (everything is mechanistic but things are too complex to predict) and instead have embraced stochastic (nothing is mechanistic but you can still do better than coin flips with models). This also pushes against neo-Newtonian concepts of outcomes. Like independence of observations and time-ordering, quantum physicists dumped determinism a long time ago; it's about time the social scientists did, too.

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Together, these works make a significant contribution towards redefining the scope and aims of global security studies—and yet all could be further expanded into a richer, more complex approach if the neo-Newtonian philosophies of science are finally abandoned as well in favor of a quantum mechanical metaphor. Yet in some ways these works could be even more ambitious.

A quantum mechanical approach not only allows for phenomena that are highly interdependent, simultaneous, and geographically separated; it also draws our attention to “possibilistic” in addition to “probabilistic” events: those which are highly unlikely but have enormous, even catastrophic effects (Clarke 2006). In this vein, Ward’s final thoughts on prediction and the global security system contain within them a hidden warning: it is “complicated, multilayered, unknown and changing... it may change more quickly, but maybe less dramatically.” Yet it is precisely low-probability, high-consequence events that are least likely to be predicted by quantitative approaches to prediction. These global risks—challenges, some created by humans and others by nature—have the potential to drastically alter human civilization, the planet, or life itself (see Jon Western’s first definition of global in this issue, which might be termed planetary security). Such “apocalyptic” risks include extreme climate change (see Goldstein this issue), ecological catastrophes, global pandemics, nuclear war, artificial intelligence, and asteroid impacts—and need to be on the agenda of global security studies beyond the style-over-substance think-tank efforts expended so far (Pamlin and Armstrong 2015).<sup>14</sup>

Yet these are all risks that cannot be estimated by looking at the past; they require a quantum leap of imagination that can only be enabled by discarding the neo-Newtonian approach to explanation, understanding, prescription, and prediction. The quantum mechanical approach to global security studies is already here: these authors discard old disciplining assumptions and constraints about power, independence, time, and geography in favor of a big-tent approach to global security studies no longer grounded in old IR shibboleths that limit our ability to tackle these complex global risks. It is now our charge to rise to the challenge of engaging with a global security studies that recognizes the quantum complexity of social reality and yet nonetheless still strives to both understand and explain it.

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<sup>14</sup> Ward, to his credit, reminds us of this through his oblique reference to Stephenson (2015).

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