

When quantum mechanics and international relations collide

March 30 2015, by James Der Derian And Benjamin Foldy



There are more parallels between quantum mechanics and international relations than you might think. Credit: Liam Gillick/Wikimedia, CC BY-SA

Wars and atoms have, as it were, a conjugated history.

On the eve of the second [world war](#), physicists Albert Einstein and Leó

Szilárd wrote a letter to President Franklin D Roosevelt to inform him of the destructive potential of [nuclear fission](#).

The letter would trigger a chain-reaction, as it were, beginning with the Manhattan Project and leading to the first use of nuclear weapons, continuing through to an arms race without end. Einstein later offered a [baleful post-mortem](#):

The unleashed power of the atom has changed everything save our modes of thinking, and thus we drift toward unparalleled catastrophe.

On the eve of the first world war, German Chancellor Theobald von Bethmann Hollweg predicted that the coming violence would "overthrow all that exists". He could not possibly have known how right he was.

The war emerged from a Newtonian logic; one which ensured that trains set in motion would stay in motion, carrying unprecedented assemblages of violence across vast distances until they met equal and opposite forces and settled into the stagnant equilibrium of trench warfare.

But these events would also enable a series of revolutions that made possible a paradigmatic shift to a new, post-Newtonian logic that led to the later discoveries in atomic physics.

These global [events](#) and their intellectual products changed the way we think about space and time, war and peace. But should we not also address Einstein's lament and change the way we think about these events?

When we keep notions of probability, entanglement and complementarity in mind, we must treat the relationship of their conterminous developments as more than coincidence and less than causal. The manners in which we conduct war and wage science are

always entangled, so as science changes the ways we conceive of our world, so too must we reconsider the ways we perceive and commemorate our world wars.

Two revolutions

It was Einstein and Szilárd's letter which served as the initial inspiration for last February's inaugural Q Symposium ([Q1](#)), which brought scholars from around the world to the University of Sydney's Centre for International Security Studies ([CISS](#)) to collaborate on the pursuit of new modes of thinking for a quantum era.

In many ways a prequel, the theme of last weekend's second Q Symposium ([Q2](#)) is "The Space-Time of War and Diplomacy". It takes a step back to the future to undertake a joint investigation of the complementarity of two centennial anniversaries – the first world war and the quantum revolution – that overthrew classical orders of both politics and physics.

In the time between the first stage of the quantum revolution (bracketed by Max Planck's conception of "[quanta](#)" in 1900 and Einstein's theories of [special](#) and [general](#) theories of relativity in 1905 and 1915) to the second (set off by Werner Heisenberg's uncertainty principle, Max Born's [probabilistic mechanics](#) and Niels Bohr's [complementarity principle](#)), both space and time and war and diplomacy underwent major transformations.

The Great War became the catalyst of technological and political revolutions. It took to the skies, adding new spatial dimensions that would fundamentally revolutionise warfare. It moved inside the body, combining advanced chemistry and industrialisation to mass-produce nerve agents capable of inducing the body to revolt against itself.

Requiring the mobilisation (and burdening) of more classes and groups than ever before, it took to new levels of society – with general strikes and open revolution against the extant political orders soon to follow.

And while the treaties of [Brest-Litovsk](#) and [Versailles](#) brought an end to the war in the East and the West, the revolutions were just beginning. As Bolsheviks, [Spartacists](#), fascists and others continued their efforts towards the overthrow of regimes, Bohr and contemporaries were doing the same in challenging the fundamentals of the physical universe.

Total science

The most significant battles in what everyone from [Lenin](#) to [Einstein](#) called "the crisis in physics" erupted over causality and classical determinism.

Subsequent skirmishes waged through the work of [Hermann Weyl](#), Niels Bohr, [Louis de Broglie](#), [Erwin Schrödinger](#), and [Werner Heisenberg](#) drove quantum's advance. It eroded classical causality's [entrenched position](#) through successive manoeuvres on its exposed flanks of energy conservation and newly conceived deficiencies in describing atomic processes. Within a decade, the quantum interpretation had overthrown the dominant conceptions of literally all that exists.

When later progenitors of political science envisioned the development of a ["total science" of politics](#), they brought with them the classical notion of causality from economics, history, and philosophy.

Like Q2, the nascent international relations and security literature also looked back to the future – [usually choosing the first world war](#) in particular as the "empirical" case for its scientifically described security dilemmas, spiral models and offense-defence balance. Those looking to attribute causality to events of cataclysmic violence were returning to the

very events that presaged its demise in physics.

Quantum politics

Q2 addresses the extra-disciplinary, explanatory and metaphorical powers of quantum in contrast to earlier theories, concepts and tropes borrowed from classical physics, economics and other sciences (with states as "billiard balls", "black boxes" or "rational actors") that continue to dominate much of the international security field.

With nation-states, corporations and scientific research centres – including here in Australia – pushing hard to get quantum computing, control and communications online, there is an added responsibility for universities to address the potential and actuality implications of quantum power.

It is on these lines that we think it necessary to look forward to the past once more. To question classical causality as well as to explore new quantum concepts in light of a reconfiguration of power in international politics.

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