Policy Brief

February 2025 | Volume 10, Issue 1

Overcoming Securitization in Quantum Science and Technology Policy[5]

Michael P.A. Murphy
Post-Doctoral Fellow, CIDP

Claire Parsons
CIDP Researcher

Introduction

Quantum science and technology is an important domain of emerging technology policy, both within the Department of Defence/Canadian Armed Forces (DND/CAF) as well as across the whole of society. A series of key strategic documents released by DND/CAF and Innovation, Science and Economic Development Canada (ISED) have outlined the Canadian government's approach to this important issue area. Drawing on a recent article published in the *Canadian Foreign Policy Journal* (Murphy & Parsons, 2024), this policy brief explores how the framing of quantum science and technology (S&T) in government strategy has undergone a threat intensification. Whereas earlier documents discuss quantum science and technology as a domain equally open to positive opportunity and negative threats, recent language has focused more on quantum technology as a tool for political adversaries to cause harm to Canadian stability and steal Canadian intelligence (Canada, 2021; 2022; 2023). Drawing on the framework of securitization theory, we argue that the intensification of threat language in these key strategic documents has a chilling effect on democratic oversight and consideration of the political and social impacts of quantum science and technology. By framing quantum science and technology primarily as a domain of threats and weapons for technical experts to consider, there is little room left for democratic oversight of the strategic objectives set for the domain of quantum S&T. This limitation of democratic oversight is important both for the disruptive impacts that quantum technologies may have in shaping future threat environments, military capabilities, high-value industrial opportunities, and many other sectors, but also because of the level of public funds that are being allocated to quantum S&T research and development by federal and provincial governments alike. Ultimately, we argue for a desecuritization of quantum science and technology debates in Canada, to ensure that the complex political and social dynamics of the matter can be considered in detail.

The Centre for International and Defence Policy

138 Union Street, Suite 403. Queen's University, Kingston, Ontario Canada K7L 3N6

cidp@queensu.ca

Background on Quantum Science and Technology

Quantum technologies leverage the unique properties of subatomic systems—such as superpositioning and entanglement—to radically increase the accuracy, sensitivity, speed, and security of important technologies. Superpositioning is the ability of particles to exist in two states at once, allowing them to be used in multiple tasks simultaneously, while entanglement allows particles to affect each other instantaneously over any distance. This increases the range of technologies to detect and respond to each other (Canada, 2021). Emerging quantum technologies promise to revolutionize a wide range of tools including sensors, communications systems, cryptographic protocols, and hyper-efficient computers (Kung and Fancy, 2021). These new capabilities are complex from a political perspective because they can be used for offensive as well as defensive purposes; improvements to communications and cryptography will simultaneously see some tools improve the abilities of hackers to decrypt data while others will help create virtually unbreakable systems (Kung and Fancy, 2021).

Canada has recently released three quantum documents, two of which are strategies, that guide the approach towards innovation and implementation of quantum technology in the government. The first was Canada's *Quantum S&T Strategy*, released in 2021, which laid the foundation for Canada's quantum program (Canada, 2021). The document prioritizes the domains of sensing and cryptography, arguing that a specialization in these domains will better protect the Canadian domestic security environment and appeal to allies (Canada, 2021). Within this document, quantum technology is seen as beneficial in protecting Canada and providing a path towards leadership in the international sphere (Canada, 2021).

The following year, Canada released its *National Quantum Strategy*,[1] which established guidelines for all following missions to develop quantum technology. This strategy is notably academia forward, with priorities including funding for both industry and academy (Canada, 2022). Much like its predecessor, the *National Quantum Strategy* is favourable in its depiction of quantum technology, claiming that it will create more jobs and contribute to the Canadian economy (Canada, 2022).[2] Much of the quantum technology being developed in Canada is expected to be dual-use, meaning that it will have both defence applications and broader industrial uses and economic benefits (Canada, 2021). This built upon the National Defence benefits outlined in the *Quantum S&T Strategy*, stating that such investment in defence does not just benefit those in service, but civilians as well.

As we argue in Murphy and Parsons (2024), the tonal shift by DND/CAF from the *Quanum S&T Strategy* to the *Quantum 2030* implementation plan is important because the discussion is much more pessimistic about the implications of quantum technology. The plan's purpose is to describe how DND/CAF will integrate quantum technology into the field, outlining four main missions to implement radar, lidar, algorithmic and networking technologies (Canada, 2023). Like the *National Quantum Strategy*, we note that *Quantum 2030* notes the importance of funding for quantum technology innovation programs and a desire to develop quantum literacy among STEM experts (Canada, 2023; Murphy and Parsons, 2024). However, *Quantum 2030* also stands out as it exhibits a more somber tone, continually cautioning about the risk of political adversaries developing quantum technology (Canada, 2023). In our analysis of *Quantum 2030*, we discovered 'bad actors' and associated threat language appears at an increased rate compared to the *Quantum S&T Strategy*. Despite a lack of specification,

the concern appears to be the technological advancement of adversarial nations like Russia and China (Murphy and Parsons, 2024) into what George Takach (2023) has called "Cold War 2.0."

The narrative transition from unknown innovation to threat in *Quantum 2030* is the main thesis of our argument (Murphy and Parsons, 2024). We highlight the shift from opportunity to threat and necessity, and identify potential explanations for this change in perspective. The first potential explanation is the increase in adversarial research and development progress and the possibility of industry disruption prior to policy being developed, if a threat is identified without proper procedures in place. Another possible explanation may speak to increasing geo-political tensions, as several international conflicts have broken out between 2021 and 2023. Lastly, we find a potential explanation in that through the narrative that quantum technology is necessary for the protection of the state, the government can avoid potential criticism on wasting a tighter budget as security threats must always be addressed in the eyes of securitization (Murphy and Parsons, 2024). While these explanations should be seen as potential research questions rather than fact, it is clear that the language surrounding quantum technology is changing in the Canadian space.

The Securitization of Quantum Science and Technology

Securitization theory describes the process by which issues become framed as security threats that require extraordinary measures in response. The framework was introduced in the mid-1990s through the work of Ole Waever, Barry Buzan, and Jaap de Wilde working out of the Copenhagen Peace Research Institute (Waever, 1995; Buzan et al., 1998). The basic framework states that "security" is not a fixed concept but is instead negotiated through a social process. This securitization process involves an actor claiming that a certain issue presents a threat to the security of a given entity; this securitizing move is either accepted by the actor's audience, in which case extraordinary measures are taken to shore up security, or the move is rejected by the audience. Typically, securitizing moves are made by elite executive government actors who claim defence of the country as their priority, with the citizenry as their audience. This approach to understanding security as a constructed process assumes that things are not necessarily threatening to a society in material terms, but instead through their social context and use. An arrow laying on a table, for example, is less of a threat than one in an enemy's hand.

The prescription of securitization theory is that things understood to be matters of security can no longer be dealt with according to the normal procedures of politics. Instead, following a logic that exceptional times call for exceptional measures, normal political procedures are suspended to permit the threat to be dealt with (Williams, 2003). This marks a significant development because it curtails the possibility for democratic oversight and political debate on the item deemed to be a matter of security.

Securitization theory is prescient in outlining problematic impacts of the increase in threat framing of quantum science and technology in the case of Canadian strategy. As we note in our *Canadian Foreign Policy Journal* article (Murphy & Parsons, 2024), DND/CAF publications typically present quantum science and technology as neutral in material terms, and therefore open to being a force for good in "our" hands or a threat in "enemy" hands. By increasing the attention paid to the threatening nature of quantum science and technology in enemy

hands, strategic documents make a securitizing move that calls for the removal of quantum science and technology from the realm of normal politics. This threatens to negatively impact the depth of public discourse on quantum science and technology, sidelining consideration of issues like responsible and ethical use in order to prioritize security policy.

Unlike classic examples of securitization theory, however, the extraordinary and extra-political power gained through the securitization process does not accrue to executive political actors. Instead, the result is the capture of this issue area by subject matter experts within the bureaucracy. This practice of removing issues from the scope of normal politics by elites on the grounds of their expertise was first described by Jacqueline Best (2018), who calls this phenomenon "technocratic exceptionalism."[3] Instead of the classic model of executive actors openly advocating for the exceptional status of certain issues, technocratic exceptionalism takes place either behind the scenes or in purposefully inaccessible detail. If classical exceptionalism sees highly visible actions, technocratic exceptionalism is instead a process of incremental encroachment (Murphy, 2021). In the space of quantum S&T, the consistent emphasis on the exceptional complexity of the subject matter offers cover for the issue area to be separated from public oversight by virtue of its difficulty.[4]

It is at this point that securitization also offers a roadmap to an alternative. The process of "desecuritization" describes advocacy to remove an issue from the realm of security such that it can rejoin the sphere of normal politics and debate (Waever, 1995; Hansen, 2012). Although critics of desecuritization argue that simply removing a concept from the realm of security does not ensure the outcomes of political debate will necessarily be preferable (Aradau, 2003; Salter, 2008), scholars working in the tradition of securitization theory have generally held a ceteris paribus preference for desecuritization over securitization (Waever, 1999). In the issue-area of quantum science and technology, where the policy discourse has largely remained in the hands of technocrats and the focus on security, desecuritization offers a bridge towards a more fulsome political discourse that may permit a wider-ranging debate on the potential contributions of quantum science and technology to Canadian society, principles of responsible use that can guide policy action domestically and internationally, and a more transparent consideration of where public funds should be allocated.

Recommendations

1. **Stop intensifying threat-framing**

   The intensification of threat-framing observed in Canadian strategic documents relating to quantum science and technology bears all the hallmarks of a securitizing move. Although political debate on quantum science and technology was highly limited before this intensification was observed, the removal of quantum science and technology from the scope of normal political debate risks further limiting the potential for democratic oversight of quantum science and technology policy. A first step in desecuritizing and democratizing debates around quantum science and technology is for drafters of official documents to halt the process of intensifying threat- and security-based language.

2. **Foreground dual-use opportunities**

   Many quantum technologies in development for defence and security applications are 'dual use' in their applicability, meaning that the same technologies can be deployed in both military and civilian contexts. By overtly acknowledging the dual use nature of technologies in forthcoming defence policy, the civilian applications of these technologies will be raised. This will further the desecuritization of the quantum science and technology debate by removing the distorted focus on quantum technologies as solely military technologies.

3. **Engage political debate and competency around quantum science and technology**

   Quantum science and technology is a specialized policy domain, and specialized domains are sometimes at additional risk of capture by technocratic experts (Best, 2018). Effective democratic oversight in this domain will therefore require elected representatives to develop a baseline capacity to engage in policy debates related to quantum science and technology. However, the technical detail of these requirements should not be overstated—just as politicians are able to scrutinize healthcare budgets without personally being able to perform a craniectomy or aortic dissection repair, elected representatives can debate the political and social impacts of quantum science and technology policy without the personal capacity to troubleshoot post-quantum cryptographic algorithms. There is a tension to be noted here, however: while technocrats must not be permitted to limit debate to world-class experts on technical matters, politicians cannot be given a pass to ignore quantum science and technology policy because they have not made the effort to learn the basic elements of the issue area.

Conclusion

The next generation of quantum technologies is coming, and its impact will bring widespread opportunities and challenges alike. In a world where geopolitical tensions are on the rise, there may be a temptation to focus only on the negative and threatening elements. However, the securitization of quantum science and technology as a policy domain is an incomplete response because it forecloses the opportunity for robust debate on the political and social impacts of these policy choices. For meaningful democratic oversight to be possible, Canadian quantum policy discourse must eschew threat-intensification and technocratic tendencies that shift the discussion from the scope of democratic politics into the exceptional realm of security. Desecuritizing quantum science and technology policy is not a call to ignore the potential security implications, but instead a call to take a more nuanced view of the potential for dual use applications and democratic priorities.

***Claire Parsons** is a researcher with the Centre for International and Defence Policy where she works on quantum technology's effects on the defence strategies of the Five Eyes alliance and the relationship between cybersecurity and climate change. Claire holds a Master's of Arts in Political Studies with a specialization in Nationalism, Ethnicity, Peace, and Conflict from Queen's University. Her research interests pertain to military affairs, international relations, and far-right radicalization. She was also recently appointed a 2024 Capstone Laureate of the Canadian Defence and Security Network.*

***Michael P.A. Murphy** is the Buchanan Postdoctoral Fellow in Canadian Democracy in the Department of Political Studies at Queen's University, affiliated with the Centre for International and Defence Policy. He has held appointments as a Banting Postdoctoral Fellow as well as a Digital Policy Hub Fellowship at the Centre for International Governance Innovation. He is the author of two books and over forty research articles, receiving over 2000 citations.*

Works Cited

Aradau, C. (2004) "Security and the democratic scene: Desecuritization and emancipation." *Journal of international relations and development* 7(4): 388-413.

Best, J. (2018) "Technocratic exceptionalism: Monetary policy and the fear of democracy." *International Political Sociology* 12(4): 328-345.

Best, J. (2019). "The inflation game: targets, practices and the social production of monetary credibility." *New political economy*, *24*(5), 623-640.

Best, J. (2022). "Uncomfortable knowledge in central banking: Economic expertise confronts the visibility dilemma." *Economy and society*, *51*(4), 559-583.

Buzan, B., Waever, O., & de Wilde, J. (1998). *Security: A new framework for analysis*. Lynne Reinner.

Canada (2021). "The Department of National Defence and Canadian Armed Forces Quantum S&T Strategy: Preparing for Technological Disruptions in the Future Operating Environment." Ottawa: Department of National Defence.

Canada (2022). "Canada's National Quantum Strategy. Ottawa: Innovation Science and Economic Development Canada."

Canada (2023). "Quantum 2030: The Department of National Defence and Canadian Armed Forces Quantum Science and Technology Strategy Implementation Plan." Ottawa: Department of National Defence.

Csenkey, K., & Graver, A. (2024). "Canada's national quantum strategy one year on." *Canadian Foreign Policy Journal*, 1-12.

Hansen, L. (2012) "Reconstructing Desecuritisation: The Normative-Political in the Copenhagen School and Directions for How to Apply It." *Review of International Studies* 38(3): 525–46.

Kung, J., & Fancy, M. (2021). A quantum revolution: Report on global policies for quantum Technology.

Murphy, M. P.A. (2021). "Reading technocratic exceptionalism through economic theology: Giorgio Agamben, Jacqueline Best, and the completion of the 'double paradigm' of sovereignty." *International Politics*, *58*(5), 723-737.

Murphy, M. P. (2024). "Canada's approach to quantum in security and economics: feminist foreign policy or tokenizing# WomenInSTEM?" *Canadian Foreign Policy Journal*, *30*(2), 192-205.

Murphy, M.P.A. (n.d.). "Technocratic Tendencies? Canada's Quantum Strategy and Critical International Relations Theory." *Critical Understandings of Canada and the World*. Edited by Liam Midzain-Gobin, Heather Smith, David Hornsby, and David Black. Palgrave Macmillan, forthcoming.

Murphy, M.P.A. & Parsons, C. (2024) "Tracking Quantum S&T from strategy to implementation plan: what we learned about the Canadian Armed Forces' quantum posture" *Canadian Foreign Policy Journal,* 1-16. https://doi.org/10.1080/11926422.2024.2387209

Salter, M. B. (2008) "Securitization and desecuritization: A dramaturgical analysis of the Canadian Air Transport Security Authority." *Journal of international relations and development* 11: 321-349.

Takach, G. (2023). *Cold War 2.0: Artificial Intelligence in the New Battle Between China, Russia, and America*. Simon & Schuster.

Waever, O. (1995). Securitization and desecuritization. In R. Lipschutz (Ed.), On security (pp. 46–86). Columbia University Press

Waever, O. (1999). "Securitizing sectors? reply to Eriksson." *Cooperation and Conflict* 34(3): 334-340.

Williams, M. C. (2003). Words, Images, Enemies: Securitization and international politics. International Studies Quarterly, 47(4), 511–531. https://doi.org/10.1046/j.0020-8833.2003.00277.x

Endnotes

1 For further analysis of the National Quantum Strategy, see Csenkey & Graver (2024).

2 But see also criticism for the suboptimal consideration of ethical policy questions (Murphy 2024).

3 In Best's work, this concept arises from ongoing research on the capture of monetary policy by technocratic elites in national banks (2018; 2019; 2022).

4 This connection is explored further in Murphy (n.d.).

5 The authors would like to acknowledge Caroline Dunton and Kenzie O'Day for feedback on earlier versions of the brief, and the publications team at the Centre for International and Defence Policy.