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The Emerging Technologies Arms Race, Nuclear Weapons, and Global Security

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A new technological arms race, led by the United States, Russia, and China, has begun, involving a competitive search for disruptive technologies with potentially profound military and global security implications. Such technologies as artificial intelligence, autonomous systems, quantum technologies, sensors with continuous global coverage, along with hypersonic, highly precise, and maneuverable weapon systems, are rapidly being developed and integrated into existing military structures and capabilities. The key goals of these efforts are to accelerate the tempo of warfare by reducing the time to detect, target, and destroy military objectives, to expand to a global scale the space for such actions, and to conduct them with increased precision. This arms race is reinforced by elite discourses within the major powers characterized by over-promising, parity-seeking, and fears of falling behind, as well as a sense of inevitability rooted in technological determinism. There are grounds, however, for skepticism and uncertainty in whether these still emerging technologies can credibly yield the promised new revolution in military affairs within the foreseeable future. When and whether this prospective revolution will prove technologically feasible, however, has serious global security implications. If perceived as successful, this revolution could conceivably provide those with access to these new technologies with the capacity to threaten deployed nuclear delivery systems with successful counterforce attacks anywhere and at any time – signaling the obsolescence of existing and future nuclear forces as survivable, credible means of deterrence. Such a radical development could enable new interest in nuclear arms reduction and disarmament for some states, but could drive other states towards even riskier postures and increase the likelihood of nuclear war. In either case, new forms of international cooperation aimed at restraining military capabilities, doctrines, postures, and escalation pathways will be required. This talk will present the current technological arms race, highlighting key enabling technologies, with the goal to better understand the compounding factors and risks associated with the rapid development, militarization, and deployment of emerging technologies, including the scientific and technical basis for any claims of potential transformative impacts, as well as possible arms control measures and other restraint options. It will also make suggestions on how the physics community could get involved in this debate.