

Mapping the Patent Landscape of Quantum Technologies: Patenting Trends, Innovation and Policy Implications

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Abstract

Recent technical breakthroughs underscore the potential of second-generation (2G) quantum technologies including quantum simulation, quantum sensing and metrology, quantum computation, and quantum communication. Patenting trends of such technologies are an indicator of the pace of innovation at the invention stage. Empirical studies looking at the real-world patenting activity can provide valuable evidence to help assess and guide policy proposals related to intellectual property rights (IPRs), innovation, and governance of quantum technologies. In this paper, we report the results of a study designed to map the patent landscape of quantum technologies. We evaluate the patenting trends over the last 20 years to determine: 1) the growth of quantum technology patents, 2) the technology breakdown and classification of patenting activity, 3) the choice of priority patent office, 4) the types of patent claims and strategies, 5) the subject matter of recently awarded patents, 6) the top patent owners, 7) the dominant patent portfolios, and 8) the geographical distribution of this patent activity. Based on our patent landscape study, we critically examine if patent protection is posing a problem in the technical field of quantum technologies. We show how quantum patent disclosure is moving us to an emerging quantum information commons, gradually reinforcing the public domain. Additionally, we examine the innovation and policy implications of these results in the broader context of quantum innovation initiatives, market competition, the patent/trade secret interface, and governance of quantum technologies.