

Abu Dhabi University Professor Receives Two Patents for Revolutionary Graphene-Based Quantum Technology

[Abu Dhabi University's \(ADU\) Montasir Qasymeh](#), inventor and professor of electrical engineering professor, was granted two patents in the field of quantum technology from the United States Patent and Trademark Office (USPTO). As part of the university's efforts in fostering innovation and research across various industries, ADU has supported Prof. Montasir across the different stages of his project development where the U.S. based federal agency awarded the patents as a result of two breakthrough inventions.

The first patent, titled "Frequency-tunable quantum microwave to the optical conversion process" was designed as an innovative method for mapping out protons using low-noise microwave technology that provides optical field conversion using graphene layers. The second patent was awarded for an invention titled "Frequency-tunable quantum microwave to optical conversion system." The patents hold tremendous promise to revolutionize several industries and can be applied in quantum computations, microwave technology and optical communication.

The patents describe a graphene structure that serves as a high-performance quantum modulator, capable of receiving microvolts through a microwave signal and generating optical photons at the quantum level. By employing interconnected graphene layers arranged in an interdigital configuration, the structure functions both electronically as a capacitor and optically as a periodic medium.

Among various applications of this quantum microwave-to-optical transduction system, one prominent use is its integration into the construction of modular quantum superconducting computers by employing optical fibres. The system facilitates the interconnection of distributed superconducting cryostats and processors in quantum computing architectures. This technology represents a long-awaited leap that unlocks a new realm of unparalleled computational capabilities.

The inventions have served as significant jumps in the development of quantum technology, underlining Prof. Qasymeh's dedication to his field. In addition to being a historic moment for the professor and ADU, these patents set the stage for a future powered by advanced quantum technologies that can further support new breakthroughs. Prof. Qasymeh innovation received support from the International Research Program Awards (ASPIRE) grant and was provided with the necessary resources to flourish and realize its transformative potential. The grant has enabled Prof. Qasymeh to further invest in testing and prototyping his inventions in the field of quantum technology.

[Professor Montasir Qasymeh, electrical engineering professor and inventor at](#)

[ADU](#), said: "I am honored for my work to have been recognized by the prestigious United States Patent and Trademark Office. This accomplishment could not have been achieved without ADU's ongoing support to its faculty members. Through fostering cutting-edge research and cultivating an environment that furthers innovation and paves a path towards new frontiers in science. Through quantum technology, we seek to unlock new answers in computing power, communication security and information processing. We are sure that these patents will pave the way for transformative changes in quantum computations and communications."

On this occasion, [**Dr. Hamdi Sheibani, Dean of the College of Engineering at ADU**](#), said: “We are proud of the achievements of Professor Montasir Qasymeh, the two patents serve as a valuable addition to the existing patent portfolio of both Prof. Qasymeh and other faculty members. These milestones reflect ADU’s commitment to fostering a culture centralized around innovation and scientific research to drive collective global impact.” These patents represent a significant milestone in the field of quantum technology, solidifying ADU’s prominent position as a leading institution in the high-tech quantum field regionally and globally.