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University of Lethbridge’s Quantum Alberta researchers pushing towards a second quantum revolution

You likely never think about how your new mobile phone is twice as fast as your last, why you now feel secure making bank transactions remotely, or how Google and Alexa now plan your days — it’s just the world in which we live. The technology, the security, the communicative ability can all be traced to research, and the future of these advances is even brighter thanks to work being done right now by Quantum Alberta researchers, a fifth of whom are based at the University of Lethbridge.



Dr. Saurya Das, in the University’s Department of Physics & Astronomy, is a theme leader of Quantum Alberta, a province-wide platform of more than 35 quantum researchers from the Universities of Lethbridge, Calgary and Alberta. It is made up of physicists, chemists, computer scientists, mathematicians and engineers and promotes and strengthens collaboration between researchers and institutions in quantum science and technology.

Quantum technology is an emerging field of physics and engineering that relies on the principles of quantum physics. Applications of quantum technologies include highly accurate sensor technology (for use in oil and gas or construction, for example) and secure communications and computing (for computer optimization, machine learning uses and for creating a quantum internet).

Recently, the Government of Alberta renewed its support of Quantum Alberta in terms of the five-year \$12-million Quantum Major Innovation Fund Project (QMP). Das is the principal investigator of the project. His group and the users of the project at the U of L

have received nearly \$1 million (\$400,000 from the provincial government and the rest from other granting agencies) for their part.

“This shows the confidence of the government in our researchers and the other universities that they will deliver the project as promised, and in particular advance quantum technologies, innovation and jobs,” says Das. “The project has already supported many Highly Qualified Personnel (HQP) at the U of L, the majority of whom were attracted to Alberta from outside, which would not have been possible without the grant.”

Indeed, the provincial government sees quantum technology as a major driver of economic diversification.

“Diversifying our economy has never been more important,” says Doug Schweitzer, Minister of Jobs, Economy and Innovation. “Establishing Alberta as a leader in quantum technologies will give a competitive boost to our economy and create new jobs today and for the future.”

The main areas of research at the U of L in support of Quantum Alberta are in the studies of quantum gravity, quantum sensing and quantum computation. Joining Das as part of Quantum Alberta are fellow researchers Drs. Mark Walton and Pasquale Bosso (physics & astronomy); Daya Gaur, Robert Benkoczi and Shahadat Hossain (mathematics & computer science); and Stacey Wetmore (chemistry & biochemistry). The QMP Lethbridge team consists of most of the above researchers as well as Dr. Athanasios Zovoilis (chemistry & biochemistry).

“Quantum technology will deliver the second quantum revolution in the 21st century in terms of quantum devices, quantum computers, quantum internet and so on,” says Das, adding the first revolution was in the early 20th century. “It is not surprising that academia, industry and the provincial and federal governments are prioritizing quantum technologies and providing the necessary resources for advancing the field. The future of the world is quantum!”

To view online: <https://www.uleth.ca/unews/article/university-lethbridge%E2%80%99s-quantum-alberta-researchers-pushing-towards-second-quantum>

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