Edge Processing driven by Quantum Technologies for Green Chemicals

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The work of David Deutsch, Peter Shor, J. Preskill, Kang Wang, Wolfgang Paul, J. Martinis, Christopher Monroe and many others has spawned industrial and governmental interest in practical applications of quantum information processing. Movement from theoretical-to-practical has been a slow process with some controversy and some steps forward, such as, the recent Google announcement.

In this seminar, algorithms and quantum hardware will be discussed in accordance with how these technologies will alter Industry 4.0 applications either directly or in-conjunction-with advanced classical computing.

The BraneCell strategy asserts quantum processing will make its greatest impact via both edge computing and risk mitigation. A good example of these applications would be green chemical production, based on combined wind and solar. Green chemical plants by their nature are distributed (generally 1/10 the size of mega plants and in remote wind-solar rich locations). Said green chemical plants would benefit from quantum processing and quantum readiness---but have a challenging set of, IT-requirements to achieved, including, time frame of response; cloud IT-processing on *encrypted* data and/or edge fit-for-purpose quantum IT-processing, where fit-for-purpose indicates particular quantum subroutines, ie., optimization, anomaly finding, finite elements analysis, etc. Said applications and requirements work on the edge, whereas, popular first applications of quantum processing are for *ab initio* molecular modeling in the pharmaceutical and biotech industries. Our strategy asserts quantum applications paid for by profit centers (Industry 4.0, manufacturing, quantum Black-Scholes, cryptography…) will surpass cost-center applications (R&D, molecular modeling).

Part two of the seminar will look at various methods for physical qubit systems and their challenges for operating near to point-of-use, qubit entanglement scaling, error correction, cross talk and depth of circuit. The seminar is intended to give our point of view and some of the quantum technology industry's consensus implementation goals.