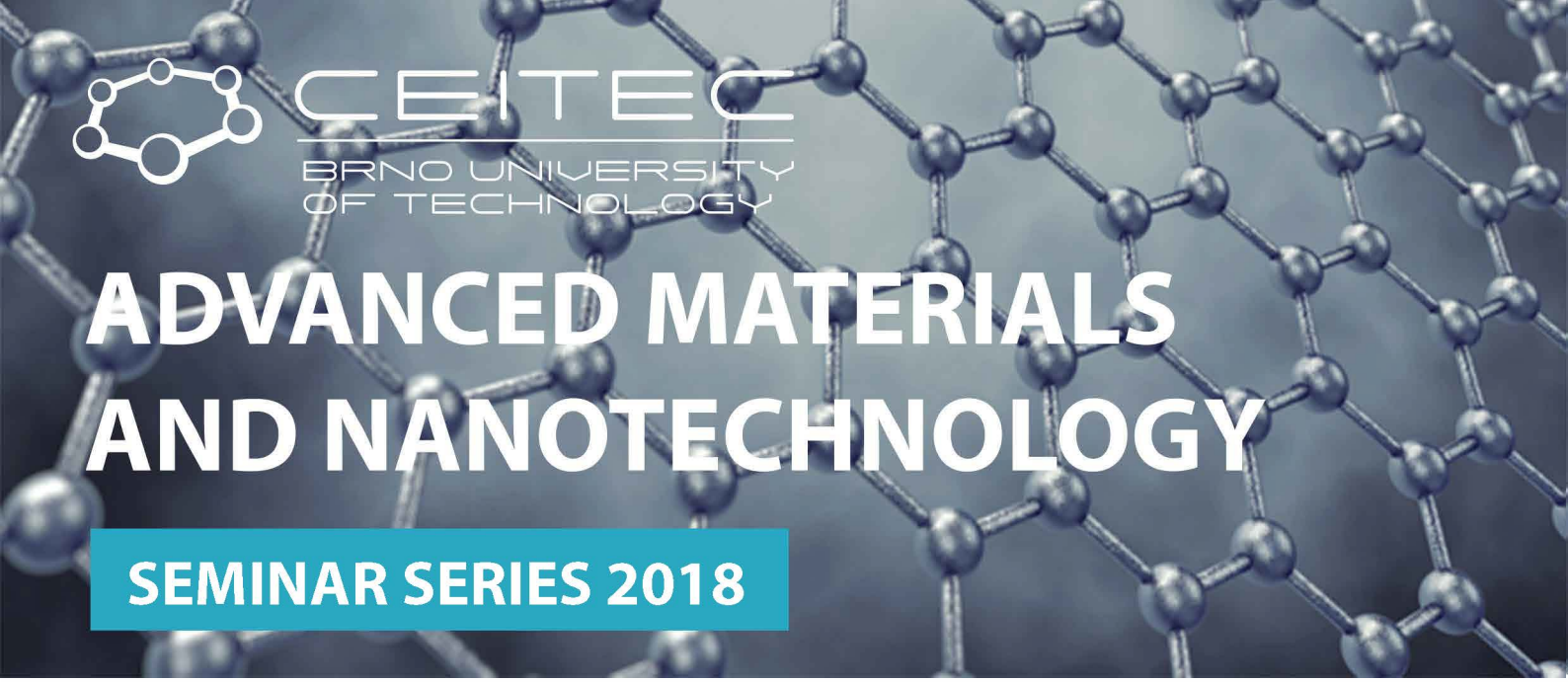

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Endohedral Fullerenes as Molecular Qubits

MAY, 29

Tuesday, 10:00

Seminar room **S2.02**
CEITEC BUT, Purkynova 123

Quantum computation could outperform classical approaches in cryptography and database searching. Among various quantum bits (qubits) candidates, molecular nanomagnets are found to be prominent since their collective spins are tunable as required. However, the nuclear spins from the ligand can act as a source of Overhauser field to decoher the electron spins. Here we demonstrate that by encapsulating the electron spins in fullerenes, it is possible to elongate the quantum coherence time largely even for the anisotropic high spin systems with many nuclear spins. The rotation of the inner group of the endohedral fullerene (Sc3C2@C80) can lead to a crossover of the quantum coherence behavior1. The anisotropic high spin system (Gd2@C79N) affords diverse Rabi cycles, allowing arbitrary superposition state manipulation between each adjacent level2. Our research suggests that this molecular magnetic material of anisotropic high spin fulfills the requirement for implementing Grover's algorithm.