Quantum Computing with Endohedral Fullerene Peapods - J. Dennis, M. Kanai (University of London), A. Briggs, K. Porfyriakis, A. Khlobystov (University of Oxford), and A. Weidinger (Hahn-Meitner Institute)

Incar-fullerenes *i*NC_{60} and *i*NC_{70} have clear potential to act as qubit systems for quantum information processing. The two spin states of the unpaired electron on each incarcerated atom embody the actual qubits. The fullerenes merely act as containers for the qubits – shielding them from chemical reaction and environmental effects that would decrease superposition correlation times. Furthermore, incar-fullerenes may be constrained to a self-assembled linear arrangement with a carbon nanotube. Thus, carbon peapods thus have clear potential to yield strings of qubits – a necessary requirement of a quantum computer. Furthermore, these systems are amenable to global addressing systems.

We have performed the first full isolation of *i*NC_{60} and *i*NC_{70}. We will present our progress on the spectroscopic characterisation of these *incar*-fullerenes, and their potential in the physical realisation of quantum computation at the meeting