Endohedral Fullerene Dimers as Potential Building Blocks for a Quantum Computer

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Endohedral fullerenes can carry quantum information, embodied in the electron spin of the encaged atom. Hence, endohedral fullerene molecules have the potential to be used as qubits for quantum computation. Production of asymmetrical endohedral fullerene dimers (e.g. *i*NC_{60}-*i*NC_{70}) can lead to ordered arrays of ABABAB sequence. This kind of molecular self-assembly offers great potential for creating a large number of reproducible qubits; a precondition for any scalable quantum computer. Additionally if qubits can be made in two varieties, A and B, then one does not need to address each A and each B individually. Global addressing schemes can be implemented by addressing all the A's separately from all the B's. This could be a solution to one of the most common hurdles towards solid-state quantum computation, the readout of a single electron spin.
We will present our progress on the production and characterisation of endohedral fullerene dimers, and their potential use in quantum computation.