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Single spin detection in endohedral fullerenes PAUL DELANEY, Tyndall National Institute, ANDREAS LARSSON, Tyndall National Institute, JIM GREER, Tyndall National Institute — Reading out single spins is challenging. We study the endohedral system of a nitrogen atom trapped inside C_{60} . The qubit here is the total electronic spin of the three valence nitrogen 2p electrons (a spin quartet). We propose a method of measuring this spin by placing the endohedral fullerene in a circuit and passing a current through it. If an electron hops onto the fullerene it becomes an anion, and we use the energy splitting between the triplet and quintuplet state of the $N@C_{60}$ anion to make the spin-polarisation of the current passed by the fullerene depend on the state of the qubit inside it. We estimate the size of this energy splitting and of the hopping matrix element between the fullerene and a nearby source or drain electrode. From these data we estimate temperature ranges and experimental geometries necessary for our read-out scheme.

Paul Delaney
Tyndall National Institute

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