Molecular Spins for Quantum Technologies

Eugenio Coronado

ICMol-Univ. Valencia, 46980 Paterna, Spain, e-mail: eugenio.coronado@uv.es

Spins provide one of the simplest platforms to encode a quantum bit (qubit), the elementary unit of future quantum computers. A challenge in this topic is to control the quantum decoherence in these spin qubits by minimizing the sources of decoherence (dipolar spin-spin interactions, hyperfine interactions and spin-phonon interactions). This loss of quantum information by interaction with the environment can be quantified by the phase memory time T_2. Here, I will show how a molecular approach can be exploited to design robust molecular quantum spin systems [Nat. Rev. Mater. 5: 87-104 (2020)] showing enhanced decoherence, allowing to control the spin state through an external electric field [Nat. Phys. 17: 1205-1209 (2021)], or hosting more than one spin qubit in order to implement quantum logic gates [Nat. Chem. 11, 301-309 (2019)].