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Towards a large scale simulation of many body ground states by measurement induced back action JOHANNES N. GREINER, 3rd Institute of Physics, University of Stuttgart, Germany, D. D. BHAKTAVATSALA RAO, Max Planck Institute for Solid State Research, 70569 Stuttgart, Germany, JÖRG WRACHTRUP, 3rd Institute of Physics, University of Stuttgart, 70569 Stuttgart, Germany — Singlet pairing is a well-studied physical mechanism in strongly correlated systems. Quantum particles paired in singlets share maximal entanglement and their total vanishing spin renders them robust to external noise. Inducing such pairing in any random spin ensemble has many potential applications in the field of quantum limited sensing[1, 2] and quantum information processing[3]. We show here how singlet pairing can be generated in an unpolarized nuclear spin ensemble which is dipolar coupled to a Nitrogen Vacancy (NV) center in diamond. Alongside the singlet formation, the long life times of these spins constitute a potential test bed for simulating quantum correlations of dimer compounds crystallizing into singlet pairs.[4]
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