Abstract Submitted
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Coherently coupling distinct spin ensembles through a high critical temperature superconducting resonator ALBERTO GHIRRI, Istituto Nanoscienze - CNR, via Campi 213/a, Modena, Italy, CLAUDIO BONIZZONI, Dipartimento FIM, Universita di Modena e Reggio E. and Istituto Nanoscienze - CNR, via Campi 213/a, Modena, Italy , FILIPPO TROIANI, Istituto Nanoscienze - CNR, via Campi 213/a, Modena, Italy, MARCO AFFRONTE, Dipartimento FIM, Universita di Modena e Reggio E. and Istituto Nanoscienze - CNR, via Campi 213/a, Modena, Italy — The problem of coupling remote ensembles of two-level systems through cavity photons is revisited by using molecular spin centers and a high critical temperature superconducting coplanar resonator [1]. By using PyBTM organic radicals, we achieved the strong coupling regime with values of the cooperativity reaching 4300 at 2 K [2]. We show that up to three distinct spin ensembles are simultaneously coupled through the resonator mode. The ensembles are made physically distinguishable by chemically varying the g-factor and by exploiting the inhomogeneities of the applied magnetic field. The coherent mixing of the spin and field modes is demonstrated by the observed multiple anticrossing, along with the simulations performed within the input-output formalism, and quantified by suitable entropic measures. [1] A. Ghirri, C. Bonizzoni, D. Gerace, S. Sanna, A. Cassinese and M. Affronte, Appl. Phys. Lett. 106, 184101 (2015). [2] A. Ghirri, C. Bonizzoni, F. Troiani, N. Buccheri, L. Beverina, A. Cassinese and M. Affronte, Phys. Rev. A 93, 063855 (2016).

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