

Abstract Submitted
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Critical Spin Dressing REZA TAVAKOLI DINANI, MICHAEL HAYDEN, Simon Fraser University — Magnetometry is critical to many experiments that test fundamental symmetries. It has long been proposed [1] that spin dressing [2] could be employed to realize a highly effective helium-3 nuclear precession co-magnetometer for a neutron electric dipole moment search. This would involve applying an intense, continuous, and far off-resonant oscillating magnetic field in such a way that the apparent Larmor precession frequency of both species is modified. Under appropriate conditions a desirable situation known as critical dressing is anticipated: the neutron and the helium-3 nucleus (or more generally, any two spin species) are expected to behave as if they had the same gyromagnetic ratio and hence should precess at the same rate in a static magnetic field. Spin dressing has been studied in the context of the neutron [3], helium-3 [4], and other systems [5]. Critical dressing, however, has not previously been demonstrated. We will present results from recent experiments in which simultaneous dressing of two spin species is studied, and in which critical dressing is observed. [1] Phys Rep **237**, 1 (1994) [2] J Phys (France) **30**, 153 (1969) [3] Phys Rev Lett **58**, 2047 (1987) [4] Phys Rev A **85**, 3 (2012) [5] Nature 471, **83** (2011); Nature **476**, 185 (2011)

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