

Harmonic tuning and dressing of atomic spins

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In this contribution we will give some details of how the addition of a weak oscillating field strongly modifies the dressing of atomic spins and enhances and enriches the system quantum dynamics¹. The secondary field allows for a fine tuning of the atomic response and produces effects not accessible with a single dressing field, such as a spatial triaxial anisotropy of the spin coupling constants and acceleration of the spin dynamics. This tuning-dressed configuration introduces an extra handle for the system full engineering for quantum control applications. Moreover the proposed scheme may have relevant applications in the different fields such as Ultra-Low-Field NMR, magnetic induction tomography and inhomogeneous dressing enhancement of atomic resonance².

[1] G. Bevilacqua, V. Biancalana, A. Vigilante, T. Zanon-Willette, and E. Arimondo; Harmonic fine tuning and triaxial spatial anisotropy of dressed atomic spins, *Phys. Rev. Lett.* **125**, 093203 (2020).

[2] G. Bevilacqua, V. Biancalana, Y. Dancheva, and A. Vigilante, Restoring Narrow Linewidth to a Gradient-Broadened Magnetic Resonance by Inhomogeneous Dressing, *Phys. Rev. Applied* **11** 024049 (2019)