

Optical pumping of atomic orientation driven by broadly-frequency-modulated radiation.

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We investigate magnetic resonances driven in thermal vapor of alkali-metal atoms by laser radiation broadly modulated at a frequency resonant with the Zeeman splitting. An analytical model accounting for both hyperfine and Zeeman pumping is developed, and its results are compared with experimental measurements performed at relatively weak pump irradiance. The interplay between the two pumping processes generates intriguing interaction conditions, often overlooked by simplified models.

[1] G. Bevilacqua, V. Biancalana, Y. Dancheva; “Atomic orientation driven by broadly frequency-modulated radiation: Theory and experiment”; Phys.Rev:A 94, 012501 (2016)