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Mechanism of reversed dark resonances — •Janis Alnis and Marcis Auzinsh — University of Latvia, 19 Rainis Blvd., LV-1586, Riga, Latvia

Dark resonance in atomic vapor means decrease of both light absorption and fluorescence at zero external magnetic field. This is a kind of optical pumping when part of population decays to ground state magnetic sublevels that can not be further excited by light untill external magnetic field mixes the ground state levels. Recently a reversed dark resonance has been observed in ^{85}Rb where increase of absorption and fluorescence takes part at zero magnetic field [1]. We try to explain it [2]. Reversed dark resonance appears when excited state posess larger total angular momentum than ground state providing that under linearly-polarised-light excitation, population can not be trapped in any of the ground state sublevels. Calculated transition probabilities between ground and excited state sublevels show that ground state level $M = 0$ is most absorbing and also total fluorerscence to this level is largest compared to other ground state levels. As a result when external magnetic field is applied it mixes ground state levels causing decrease of absorption. We model reversed dark resonance signal quantitatively using density matrix formalism [3].

[1] Y. Dancheva, G. Alzetta, S. Cartalava, M. Taslakov, Ch. Andreeva, Opt. Comm. **178** 103, (2000)

[2] J. Alnis, M. Auzinsh, Los Alamos preprint http://mentor.lanl.gov

[3] M. Auzinsh, R. Ferber, Optical Polarization of Molecules, Cambridge University Press, Cambridge UK, 1995

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