Reanalysis of the odd configuration system of scandium atom

J.Dembczyński[1], M.Elantkowska[1], J.Ruczkowski[1]

[1]*Poznań University of Technology, Laboratory of Quantum Engineering and Metrology, ul. Nieszawska 13B, 60-965 Poznań, Poland*

We report the fine- and hyperfine structure analysis of the odd configurations system of scandium atom in a large multiconfiguration basis. The configurations selected for the basis have to satisfy the following conditions: they should contribute to eigenvector composition of the levels with experimentally determined hyperfine structure constants and they should extend in the energy region up to 65000 cm^{-1}. We have tried to take into account first- and second-order effects in the fine- and hyperfine structure as comprehensively as possible with all experimental energy level and hyperfine structure constants available at present [1-7].

The good agreement between calculated and experimental energy levels and hyperfine structure constants was achieved. For all the levels belonging to the selected configuration basis the predicted hfs A constants have been calculated.

This work was supported by The National Centre for Science (Poland) under the project N N519 650740

References:

[1] Yu. Ralchenko, A.E. Kramida, J. Reader and NIST ASD Team 2011 NIST Atomic Spectra Database (ver. 5.0), [Online]. Available: http://physics.nist.gov/asd [2013]. National Institute of Standards and Technology, Gaithersburg, MD
[2] E. Siefart, Ann. Phys.34, 286 (1977)
[3] W. Ertmer, B. Hofer, Z. Phys. A 276, 9 (1976)
[4] R. Singh, G.N. Rao, R.K. Thareja, J. Opt. Soc. Am. B8,12 (1991)
[5] A. Aboussaıd, M. Carleer, D. Hurtmans, E. Biemont, M.R. Godefroid, Phys. Scr. 53, 28 (1996)
[6] Go. Basar, Gu. Basar, F.G. Acar, I.K. Oztruk, S. Kroeger, Phys. Scripta 69, 189 (2004)
[7] I.K. Oztruk, F.G. Acar, Gu. Basar, Go. Basar, S. Kroeger, Phys. Scripta 75, 624 (2007)