New experimental hyperfine structure constants of high-lying even-parity levels of vanadium

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The present work is a continuation of our previous study of the hyperfine structure (hfs) of atomic vanadium (V I), determining the magnetic dipole hfs *A* constants of energy levels [1] and [2], respectively. Here, high-lying energy levels are the focus of research, the hfs constants of which have not previously measured.

High-resolution spectra of vanadium-argon plasma have been recorded with a resolution of 0.03 cm^{-1} using a Bruker IFS 125HR Fourier Transform spectrometer at the Laser Centre of University of Latvia in the spectral range from 15000 cm^{-1} to 27000 cm^{-1}. The plasma was produced in a hollow cathode discharge. In order to reduce the Doppler width of the spectral lines, the hollow cathode was cooled by liquid nitrogen.

The spectral lines of V I from the FT spectrum have been classified using the classification program *Class_Iw* [3] as well as the energy levels and their classifications taken from [2], the most recent comprehensive work on the fine structure of atomic vanadium. To determine the magnetic dipole hfs constants *A*, the hfs of spectral lines have been fitted with Voigt profile functions using the program *Fitter* [4]. Because in our FT spectra the hfs of all lines was not or was only partly resolved, a reliable fit was possible only, if the hfs constant of one of the two levels, involved in the transition, is fixed during the fit. This has been done for the low-lying energy levels, the *A* constants of which are well-known from literature [5-9].

As a result, the experimental magnetic dipole hfs constants *A* of high-lying levels of even parity have been determined and will be presented.

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