

Atomic structure and transition parameters of the V XVIII carbon-like ion

**Lamia Abu El Maati¹, Mahmoud Ahmad^{2,3}, I. S. Mahmoud^{2,4},
Sahar G. Tawfik^{5,6}, Najah Alwadii⁷, Nabil Ben Nessib⁸ and
Milan S. Dimitrijević^{9,10}**

¹*Department of Physics, Faculty of Science, Benha University, Benha, 13513, Egypt*

E-mail: lamia.aboelmaaty@fsc.bu.edu.eg

²*Physics Department, College of Science in Zulfi, Majmaah University, 11952, Saudi Arabia.*

E-mail: M.ahmad@mu.edu.sa

³*Physics Department, Faculty of Science, Al Azhar University, 71524 Assuit, Egypt.*

E-mail: M_ahmed@azhar.edu.eg

⁴*Physics Department, Faculty of Science, Suez Canal University, Ismailia, Egypt.*

E-mail: i.shaarany@mu.edu.sa

⁵*Physics Department, Faculty of Science, Alexandria University, Egypt*

⁶*Department of Physics, College of Science, Princess Nourah Bint Abdulrahman University, P.O. Box 84428, Riyadh 11671, Saudi Arabia*

E-mail: Sgmohamed@pnu.edu.sa

⁷*Department of Physics, College of Sciences, King Khalid University, Saudi Arabia*

E-mail: nalwadee@kku.edu.sa

⁸*Department of Physics and Astronomy, College of Sciences, King Saud University, Saudi Arabia*

E-mail: nbnessib@ksu.edu.sa

⁹*Astronomical Observatory, Volgina 7, 11060 Belgrade, Serbia*

E-mail: mdimitrijevic@aob.rs

¹⁰*LERMA, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université, 5 Place Jules Janssen, 92190 Meudon, France*

The atomic and collisional parameters of carbon-like ions are significant for many important astrophysical quantities, such as the modeling of stellar atmospheres, the determination of stellar abundance, the analysis of spectral lines for laboratory plasmas or astronomical objects.

In this contribution, we calculated the energy levels and lifetimes of the carbon-like vanadium ion (V XVIII) using the atomic structure codes AUTOSTRUCTURE and GRASP2018. Weighted oscillator strengths and

transition probabilities are also calculated for the allowed transitions between the energy levels considered.

The calculations were carried out for the first 17 configurations: $2s^22p^2$, $2p^4$, $2s^22p3p$, $2s2p^23s$, $2s2p^23d$, $2p^33p$, $2s^22p4p$, $2s^23d^2$, $2s2p^3$, $2s^22p3s$, $2s^22p3d$, $2s2p^23p$, $2p^33s$, $2p^33d$, $2s^22p4s$, $2s^22p4d$ and $2s2p3d^2$.