

IMPROVED SIMULATIONS OF STARK BROADENED HELIUM LINE PROFILES FOR DB WHITE DWARFS

Patrick Tremblay, Alain Beauchamp, Pierre Bergeron

Département de Physique, Université de Montréal, Montréal, QC H3C 3J7, Canada

The determination of the physical parameters of white dwarfs has been made either through the spectroscopic method or through the photometric method. In the case of DB white dwarfs, a disagreement between the parameters obtained from these two methods motivated a revision of the line profile broadening theory of neutral helium lines, more specifically Stark broadening, in use in the current He I tables at optical wavelengths. By replacing the semi-analytical approach by a simulation environment, a new grid of helium Stark-broadened line profiles, including ion dynamics, has been produced for 12 spectral lines for densities between 10^{14} cm^{-3} and $10^{17.5} \text{ cm}^{-3}$ and temperatures between 10,000 K and 40,000 K. We present synthetic spectra obtained with these new profiles and highlight the differences with previous calculations. We also discuss the possible impact on the determination of physical parameters of DB white dwarfs.