A new grid of LTE model atmospheres for hot white dwarfs and its application to CAL 83 and RX J0513.9−6951

V. Suleimanov, V. Doroshenko, T. Rauch, A. Tavleev, and K. Werner

Institut für Astronomie und Astrophysik, Kepler Center for Astro and Particle Physics, Universität Tübingen, Sand 1, D-72076 Tübingen, Germany

We present a new grid of plane-parallel hot white dwarf (WD) model atmospheres designed for modeling of the high-resolution X-ray spectra of super-soft sources (SSSs) in the Large Magellanic Cloud (LMC).

The models were computed using the LMC chemical composition, namely solar H/He mix and the half solar heavy element abundances. We construct a two-parameter model grid with the effective temperature $T_{\rm eff}$ and $\Delta \log g = \log g - \log g_{\rm Edd}$ characterizing the distance of a given grid point from the Eddington limit as free parameters. We consider the 15 most abundant chemical elements and about 20 000 spectral lines from the CHIANTI database for spectroscopic diagnostics of astrophysical plasmas to calculate model spectra for each point. We convert the grid into XSPEC atable format models and employed it to approximate Chandra LETG spectra of two well studied SSSs, namely CAL 83 and RX J0513.9−6951 to estimate consistently the WD's parameters. In particular, we impose an additional relation gf mass M and radius R suggested by Suleimanov & Ibragimov (2003), $R = 2R_{\rm cold}(M_\odot/M)^2$, where $R_{\rm cold}$ is the radius of the cold WD with the given mass M.

We compare the results with previous NLTE modeling of hot WDs and discuss the advantages and limitations of our newly calculated grid.