A new grid of NLTE accretion-disc models for AM CVn systems: application to CE 315

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AM CVn stars are very compact interacting binary systems with helium-dominated spectra. The nature of the donor star remains unclear, but the accretion disc represents the chemical composition of the donor's atmosphere. Analysing the disc will therefore help us to understand the donor star and the formation of these systems. We investigate the influence of primary mass, mass-accretion rate, chemical abundances, irradiation by the primary, and inclination on the spectrum of the accretion disc to determine the extent to which it is possible to deduce these system properties by comparison with observed spectra. We compute a grid of metal-line blanketed NLTE accretion-disc spectra for an extensive parameter space by solving self-consistently the radiative-transfer equations and the equations describing the vertical structure using our accretion disc code *AcDc*. We detect emission-line spectra for low and absorption-line spectra for high mass-accretion rates. Irradiation of the accretion disc by the primary has almost no influence on the spectrum. The spectroscopic detection of the primary is achievable most easily in the UV. Comparing an observed spectrum of CE 315 with our accretion-disc models, we find the qualitatively closest match for a $0.8\,\mathrm{M}_\odot$ primary and a mass-accretion rate of $10^{-11}\,\mathrm{M}_\odot/\mathrm{yr}$. Furthermore, the disc of CE 315 exhibits a strong silicon underabundance confirming the hypothesis that it is a Pop. II object.