The stellar wind and accretion disk emission anti-correlation in Cygnus X-1: insights from multi-wavelengths observations

Abstract

First discovered in 1964, the High-mass X-ray binary Cygnus X-1 contains a 21.2 solar-mass black hole and a 40.6 solar-mass (B0 or O9.7 Iab-type) star - also known as HDE 226868. For over 60 years, the system has been widely studied in X-rays and optical wavelengths. I will present the results obtained from the optical monitoring of the binary using the 2m-Perek telescope located in Ondrejov in the Czech Republic, simultaneously with X-ray observations. The optical data were analysed using the method of Fourier Disentangling which separates the different spectral components of a multiple system (in our case the stellar atmosphere from the circumstellar matter). The variable profiles of hydrogen and helium lines are used to study the structure and kinematics of the stellar atmosphere and the circumstellar matter in the system. This method enables a new perspective on the strong correlation between the X-ray emission from the accretion disk and the optical/UV emission from the stellar wind.