

An X-ray Survey of Low-mass Stars in Trumpler 16 with Chandra

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Aims. We identify and characterize low-mass stars in the ~ 3 Myr old Trumpler 16 region by means of a deep Chandra X-ray observation, and study their optical and near-IR properties. We compare X-ray activity of Trumpler 16 stars with known characteristics of Orion and Cygnus OB2 stars.

Methods. We analyzed a 88.4 ksec Chandra ACIS-I observation pointed at the center of Trumpler 16 . Because of diffuse X-ray emission, source detection was performed using the PWDetect code for two different energy ranges: 0.5-8.0 keV and 0.9-8.0 keV. Results were merged into a single final list. We positionally correlate X-ray sources with optical and 2MASS catalogues. Source events were extracted with the IDLbased routine ACIS-Extract. X-ray variability was characterized using the Kolmogorov-Smirnov test and spectra were fitted by using XSPEC. X-ray spectra of early-type, massive stars were analyzed individually.

Results. Our list of X-ray sources consists of 1035 entries, 660 of which have near-IR counterparts and are probably associated with Trumpler 16 members. From near-IR color-color and color-magnitudes diagrams we compute individual masses of stars and their A_v values. The cluster median extinction is $A_v = 3.6$ mag, while OB-type stars appear less absorbed, having $A_v = 2.0$ mag. About 15% of the near-IR counterparts show disk-induced excesses. X-ray variability is found in 77 sources. OB stars appear softer, but have an X-ray luminosity about 10 times, that of the low-mass stars.

Conclusions. The Trumpler 16 region has a very rich population of low-mass X-ray emitting stars. An important fraction of its circumstellar disks survive the intense radiation field of its massive stars. Stars with masses $1.5-2.5 M_{\odot}$ display X-ray activity similar to that of stars in CygOB2 but much less intense than observed for Orion Nebula Cluster members.