

Hard diffuse X-ray emission in the star-forming region ON2: discovery with XMM-Newton

L.M. Oskinova, R.A. Gruendl, R. Ignace, , Y.-H. Chu, W.-R. Hamann, A. Feldmeier

Universities of Potsdam, East Tennessee State, Illinois

We obtained X-ray XMM-Newton observations of the open cluster Berkeley 87 and the massive star-forming region (SFR) ON 2. In addition, archival infrared Spitzer Space Telescope observations were used. It is likely that the SFR ON 2 and Berkeley 87 are at the same distance, 1.23 kpc, and hence are associated. The XMM-Newton observations detected X-rays from massive stars in Berkeley 87 as well as diffuse emission from the SFR ON 2. The two patches of diffuse X-ray emission are encompassed in the shell-like H II region GAL 75.84+0.40 in the northern part of ON 2 and in the ON 2S region in the southern part of ON 2. The diffuse emission from GAL 75.84+0.40 suffers an absorption column equivalent to A_V approx. 2.8 mag. Its spectrum can be fitted either with a thermal plasma model at $T < 30$ MK or by an absorbed power-law model with γ ; approx. -2.6. The X-ray luminosity of GAL 75.84+0.40 is L_X approx. $1 \cdot 10^{32}$ erg/s. The diffuse emission from ON 2S is adjacent to the ultra-compact H II (UCHII) region Cygnus 2N, but does not coincide with it or with any other known UCHII region. It has a luminosity of L_X approx. $6 \cdot 10^{31}$ erg/s. The spectrum can be fitted with an absorbed power-law model with γ ; approx. -1.4. We adopt the view of Turner and Forbes (1982) that the SFR ON 2 is physically associated with the massive star cluster Berkeley 87 hosting the WO type star WR 142. We suggest that SFR ON 2 emits hard diffuse X-rays by a synchrotron mechanism, invoked by the co-existence of strongly shocked stellar winds and turbulent magnetic fields in the star-forming complex.

Reference: ApJ

Status: Manuscript has been accepted

Weblink: <http://www.astro.physik.uni-potsdam.de/research/abstracts/oskinova-ber87.html>

Comments: arXiv:1001.4798

Email: lida@astro.physik.uni-potsdam.de