Diffuse X-rays from PNe with WR-type central stars

U. Rühling[1,2], C. Sandin[2], M. Steffen[2], D. Schönberner[2], W.-R. Hamann[1], H. Todt[1]

[1] *Institut für Physik und Astronomie, Universität Potsdam, Germany*
[2] *Astrophysikalisches Institut Potsdam, Germany*

Planetary nebulae have been identified as weak, diffuse X-ray sources. Recently we added an observation of Abel 30 with XMM-Newton. We want to exploit the X-ray emission from PNe with hydrogen-deficient, [WC]-type central stars to constrain their still enigmatic origin. Different scenarios have been proposed, attributing the loss of hydrogen to a "late", "very late", or "AGB final" thermal pulse (LTP, VLTP, and AFTP, respectively). With a 1-D hydrodynamical code we model such nebulae, accounting for the stellar wind from the [WC]-type central star. For the first time, the models include a description of heat conduction in a hydrogen-poor plasma and we found that such heat conduction is able to cool the shocked gas sufficiently to achieve X-ray emitting temperatures. In case of a late thermal pulse, the fast central-star wind that sweeps up the nebula was hydrogen deficient from the beginning. Thus, the hot X-ray emitting bubble is expected to fill the whole nebula, showing a metal-rich, hydrogen-poor spectrum. A very late thermal pulse, on the other hand, occurs after a hydrogen-rich stellar wind already swept up the nebula. In this case, the X-ray emitting region is expected to be located closer to the central star. Although the X-ray observations suffer from the low brightness of the sources, we hope that the detailed comparison with the models will help to discriminate between different evolutionary scenarios.