X-ray study of the supernova remnant G296.8-0.3

E. Sánchez Ayaso[1], J.A. Combi[2,3], J.F. Albacete Colombo[4], J. López-Santiago[5], A. J. Muñoz Arjonilla[1], J. Martí[1]

1- Escuela Politécnica Superior de Jaén (EPSJ), Universidad de Jaén (Spain). [esayaso@ujaen.es] , [jmarti@ujaen.es] [ajmunoz@ujaen.es]
2- Instituto Argentino de Radioastronomía (CCT La Plata, CONICET), C.C.5, (1894) Villa Elisa, Buenos Aires, Argentina. [jcombi@fcaglp.unlp.edu.ar]
3- Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, La Plata, Argentina.
4- Centro Universitario Regional Zona Atlántica (CURZA), Univ. Nacional del COMAHUE, Viedma (Negro), Argentina. [donfaca@gmail.com]
5- Departamento de Astrofísica y Ciencias de la Atmósfera, Universidad Complutense de Madrid, E-28040, Madrid, Spain. [jls@astrax.fis.ucm.es]

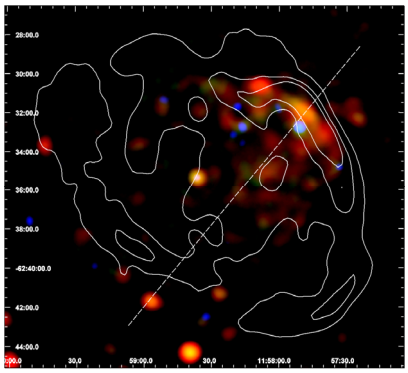
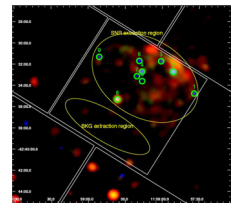


Fig.1.Tri-colour XMM-Newton image generated for three energy bands: 0.4-1.0 keV (red), 1.0-2.0 keV (green), and 2.0-4.0 keV (blue) of G296.8-0.3 together with MOST radio contours.

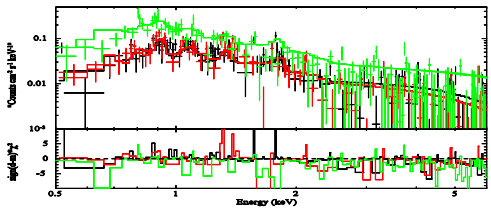
In this poster we report X-ray observations of the southern SNR G298.6-0.3 performed with the XMM-Newton telescope, and complementary radio/infrared data. In order to explore possible evolutionary scenarios to understand its unusual morphology observed at radio frequencies, we investigate the correlation between the spatial and spectral properties of the X-ray emission detected from the object.

The X-ray structure of the supernova remnant G296.8-0.3 is complex and covers ~ 60 % of the total radio morphology. It shows three different components: interior diffuse emission coinciding with the unusual rectangular strip (Gaensler et al. 1998) running through its center seen at radio frequencies (indicated with dash line), a bright soft shell-like feature with an angular size of ~ 8' coincident with the northwest radio shell, and at least 9 point-like sources. Among them 8 display medium and hard X-ray emission and could be background AGNs.



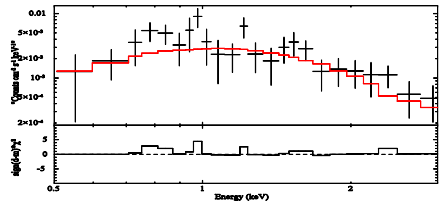
Extractions regions used for the spectral analysis in yellow. The point-like X-ray sources are indicated by green circles with radii of 15".

The diffuse X-ray emission

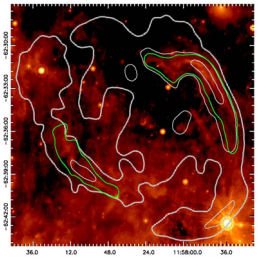


The global spectrum has two components. The diffuse X-ray emission of the SNR (dominant in the energy range of 0.4-2.6 keV) plus the contribution of the point-like sources (mainly contributing in energy range of 2.0–6.0 keV). The first one is clearly dominated by thermal emission. Thus, to fit the spectrum we used a PSHOCK model affected by an absorption interstellar model (PHABS; Balucinska-Church and McCammon 1992), but freezing all the PL parameters associated to the point-like sources.

The X-ray source 2XMMi J115836.1-623516



We find an X-ray source located close to the geometrical center of the radio structure (α=11^{h}58^{m}36.^{s}2, δ=-62°35'20."0 ; *J2000)*. The object presents some characteristics of the so-called compact central objects (CCO), and a neutral hydrogen absorption column N_H consistent with that of the SNR. However, the characteristics of its X-ray spectrum is incompatible with those found in CCOs. The spectrum was fitted using a single thermal model (APEC; Smith et al. 2001). It is typical of a low-mass star, probably a foreground star.



Spitzer MIPS 24 μm image of G296.8-0.3 with the radio contours at 843 MHz (in white) and the extraction regions used for computing the infrared fluxes (in green) superimposed. The 24 μm emission is strongly correlated with the radio shells, with several faint filaments coincident on the northwest and southeast parts of the SNR. This emission is generally interpreted as thermal emission from dust grains that have been swept up and shock-heated by the supernova blast wave (Tappe et al. 2006). The mid-infrared fluxes at 24 μm of the northwest and southeast regions are 30.16±0.2 Jy and 14.26±0.1 Jy, respectively. The X-ray emission detected on the northwest radio shell follows the infrared emission very well, which demonstrates the connection between the X-ray emitting plasma and the heated dust grains.

CONCLUSIONS AND FUTURE PROSPECTS:

The results show that there is internal X-ray emission and a partial shell-like structure on the northwest side of the remnant that correlates well with the radio emission. The spectral study confirms that the X-ray diffuse emission is mainly thermal, plus a non-thermal contribution of hard point-like sources. High-resolution X-ray observations with the Chandra satellite are necessary to better study this remnant.

REFERENCES:

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