

# New X-ray analysis of the SNRs in the neighbourhood of SNR 1E0102-7219 using XMM-Newton EPIC MOS

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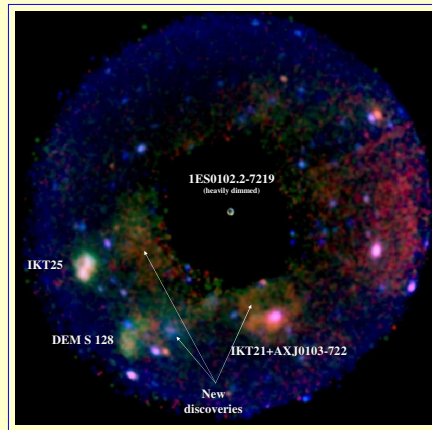
## Abstract:

The Small Magellanic Cloud (SMC), due to its small distance, is an optimal candidate to study supernova remnants (SNRs). Today a total number of about 20 SNRs are known in the SMC (Filipović et al. 2008). XMM-Newton EPIC observations of the bright SNR 1E0102-7219 cover also the fainter SNRs IKT25, IKT21 and DEM S128 in its field-of-view. We present morphology studies for these SNRs, an update of the diameter estimate of IKT21, as well as new discoveries based on XMM-Newton EPIC-MOS field-of-view data.

## The data:

The SMC SNR 1E0102.2-7219, at a distance of ~60 kpc (Hilditch et al. 2005) and proposed to be used as a X-ray calibration standard by the IACHEC (Plucinsky et al. 2008), is one of the main calibration targets of XMM-Newton. Over the complete mission, 26 observations are available, mainly with EPIC-pn in small window and EPIC-MOS in large window mode. Due to its design, the XMM-Newton EPIC-MOS instrument (Turner et al. 2001) provides field-of-view (FOV) data independent of the selected mode. We analysed these EPIC-MOS FOV data which, combined together, build a data set of about a megasecond of GTI corrected exposure time.

Colour code of the FOV image: red = OVII+OVIII, green = NeIX+NeX, blue = 1.1-7.0 keV

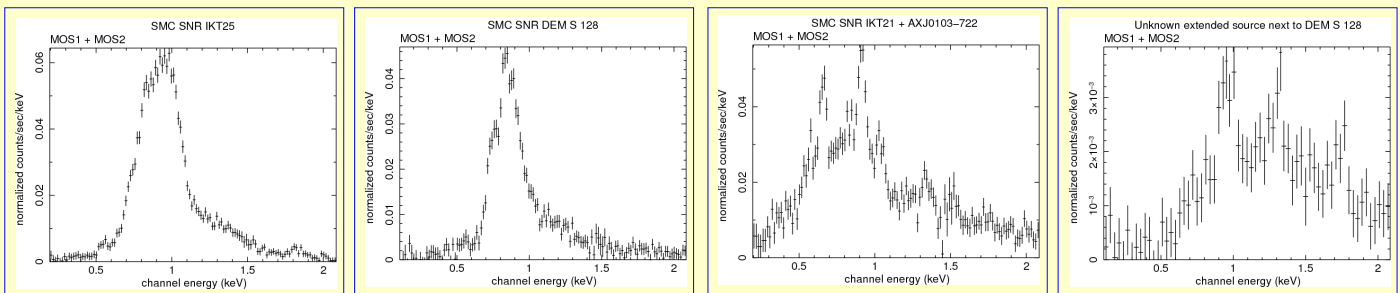


## New discoveries:

- X-ray shell around IKT21. The shell is dominated by OVIII and NeIX emission. It could not be detected by van der Heyden et al. (2004). Filipović et al. (2008) found an extension of 20.9 pc for IKT21 (~1'' corresponds to 0.29 pc at distance of 60 kpc). We measure a diameter of ~45 pc for the newly discovered shell.
- New extended source about 3' east of DEM S 128, at RA=01:04:54.5 and DEC=-72:10:18 with a diameter of ~13 pc. Its spectrum is significantly harder than the spectra of IKT25, Dem S 128 or IKT21.
- New extended source between 1E0102.2-7219 and IKT25. The extended emission is seen in O and Ne. Possibly the source extends even to Dem S 128 and close to IKT21.

## Spectra:

Using the most recent XMM-Newton SASv9.0, we defined good-time intervals, extracted the spectra and calculated the responses of both MOS1 and MOS2 for each individual observation. The rmf and arf responses were merged to a single rsp response using marfmr of HEASOFT 6.2.2. All individual MOS1 and MOS2 spectra are loaded into XSPEC and combined via the setplot group command.



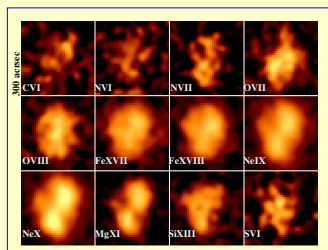
## Morphology:

For morphology studies, we extracted images using narrow energy bands around the nominal line energies. The band width is selected to cover the main peak of the response function for the corresponding energy:

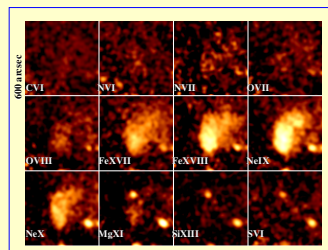
CVI (0.32-0.39 keV), NVI (0.38-0.45 keV), NVII (0.46-0.53 keV), OVII (0.53-0.60 keV), OVIII (0.61-0.68 keV), FeXVII (0.69-0.74 keV), FeXVIII (0.74-0.79 keV), NeIX (0.86-0.95 keV), NeX (0.97-1.05 keV), MgXI (1.28-1.35 keV), SiXIII (1.77-1.91 keV) and SXV (2.33-2.5 keV).

The images are not background corrected.

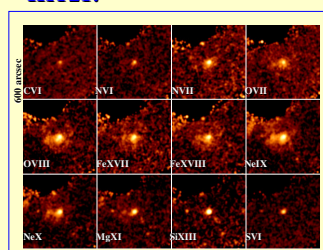
### IKT25:



### DEM S 128:



### IKT21:



## References:

- van der Heyden, K.J., Bleeker, J.A.M., Kaastra, J.S. 2004, A&A, 421, 1031-1043  
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 International Astronomical Consortium for High Energy Calibration (IACHEC), www.iachec.org  
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