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The 35th COSPAR (Committee on Space Science) Scientific Assembly was held from 18th to 25th July in Paris, France. I had an opportunity to attend the meeting supported by 21th COE Program. COSPAR’s objectives are to promote on an international level scientific research in space, with emphasis on the exchange of results, information and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research. This assembly is one of the largest assemblies on astrophysics and consists of a large number of scientific sessions. There are also interdisciplinary lectures one of which was presented by Giacconi who was awarded a nobel prize in 2002.

Fortunately I was able to have an oral presentation in the session, “Young Neutron Star and Supernova Remnants”. I talked about an observation of a supernova remnant (SNR) on 23th July. Here, I would like to introduce the abstract of my oral presentation. This study is in collaboration with Prof. Tsunemi who is my supervisor and Mr. Enoguchi who is my senior and taught how to analyze the data obtained with the “XMM-Newton” satellite.

The Vela SNR is a middle-aged SNR which exploded about 10,000 years ago (Taylor et al, 1993). It clearly shows a circular structure with a diameter of 8.3 degrees (Aschenbach et al, 1995). Aschenbach et al. (1995) discovered ‘shrapnels’, boomerang structures (from ‘A’ to ‘F’), outside the main shell. They are considered to originate from the ejecta of the supernova (SN). The Vela shrapnel A was observed with ASCA (Tsunemi et al, 1999) and with Chandra (Miyata et al, 2001). It is clarified that the abundance of Si is about 10 times higher than that of O. Therefore, they concluded that the shrapnel A is ejecta of a Si rich layer of a progenitor star.

The shrapnel D, the eastern limb of the Vela SNR is the closest to the main shell and the brightest in X-ray. We observed the shrapnel D with the XMM-Newton satellite.

There is an X-ray bright ridge structure in our FOV running from north to south. There is also an optical bright ridge structure running parallel to that in X-ray about 3’ in the east (Sankrit et al, 2003). These suggest that the shrapnel D is now interacting with an interstellar cloud. Applying the VNEI model to X-ray spectra of various regions, we find that the plasma state of the eastern region of the X-ray ridge is significantly different from that of the western region. The X-ray spectra in the western region can be well fitted with a single temperature component. Abundances of heavy elements are almost uniform, whereas they are heavily overabundant.

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(except Fe): the relative abundances to the solar values are O \sim 5, Ne \sim 8, Mg \sim 8, Fe \sim 1.

It must have originated from the ejecta of the SN. We find that the plasma in the eastern part of the ridge consists of two temperature components: one component (hot plasma) representing the ejecta while the other (cold plasma) represents the interstellar cloud or swept-up ISM. These two components must have contacted to each other, indicating to form a contact discontinuity. Around northern part of the contact discontinuity, we found wavelike structures of which the typical scales are comparable with that of the Rayleigh–Taylor instability.

It is true that I was able to understand little about all the presentations because of my poor knowledge about astrophysics as well as English. But I think I spent beneficial time throughout this assembly. On the next day I talked, I discussed about the estimation of total masses in the object with an Italian researcher who had interested in my talk. I also asked other researchers some questions at poster sessions.

Finally, I would like to appreciate Prof. Tsunemi and Mr. Enoguchi for their kind directions. I also appreciate the 21th century COE Program “Toward A New Basic Science: Depth and Synthesis” for my support.

References