Contribution ID: **28** Type: **Poster**

Search for r-process nuclear gamma-rays from binary neutron-star merger remnants with the gamma-ray satellite INTEGRAL/SPI

Thursday, 31 August 2023 13:55 (5 minutes)

One of the most promising candidates in the universe for the r-process r-process, which is the only sites that can provide elements heavier than ^{209}Bi are the binary neutron-star mergers (NSMs).The post-merger remnant becomes optically thin in a few weeks to months, and gamma-rays from the decay of r-process elements are observable in the MeV energy band. The presence of r-process nuclei in NSMs was already shown by the infrared observation of the first NSM gravitational event GW170817 (e.g.,Kasen et al.2017;Roswog et al.2018;Domoto et al.2022), and such MeV gamma-rays are expected carry more direct information on the r-process nuclei especially for Lanthanoids.In fact,however ,nuclear gamma-rays from NSMs are so dim that they are below sensitivity in the MeV missions. (Hotokezaka et al. 2016).
According to numerical estimation of gamma-rays from NSMs (Terada et al 2022), they have unique gamma-ray spectra compared with other high energy objects and thus the spectral shape can be used to identify NSMs.Numerically, Terada et al.(2022) provides a new method to identify of NSMs using color-color diagram both in the hard Xray (10-500 keV) and gamma-ray (70-3000 keV) bands.
In this study, we searched for NSM remnants at the galactic center region ($-15^\circ < l < 15^\circ$,$-20^\circ < b < 20^\circ$).The search was conducted using archived data from the INTEGRAL/SPI gamma-ray observatory, which currently has the best sensitivity in the MeV energy band. Adopting the method described above, we searched for NSMs using the color-color diagram using the five energy bands; 10-25 keV,25-70 keV, 70-500 keV, 500-1000 keV, and 1000-3000 keV, including the hard X-ray bands. As a result, one and seven candidates of NSM remnants are identified in the hard X-ray and gamma-ray bands,respectively. In this presentation, we will present a detailed analysis of the candidate sources and discuss their validity as NSM remnant candidates.

Primary author: Mr OHSUMI, Hayato (Saitama Univ.)

Co-authors: Prof. TERADA, Yukikatsu (Saitama Univ.JAXA); Mr MOTOGAMI, Yugo (Saitama Univ.); Prof. KATSUDA, Satoru (Saitama Univ.); Prof. BAMBA, Aya (U.Tokyo); Prof. YAMAZAKI, Ryo (Aoyama Gakuin); Prof. FUJIMOTO, Shin-ichiro (Kumamoto NCT)

Presenter: Mr OHSUMI, Hayato (Saitama Univ.)

Session Classification: Poster Session