

Nuclei in the Cosmos (NIC XVII)



Contribution ID: 8

Type: **Poster**

Superheavy Elements in Kilonovae

Tuesday, 19 September 2023 17:00 (5 minutes)

With LIGO-Virgo-KAGRA in its fourth observing run, a new opportunity to search for electromagnetic counterparts of compact object mergers is also upon us. The light curves and spectra from the first “kilonova” associated with a binary neutron star binary (NSM) suggests that these sites are hosts of the rapid neutron capture (“ r ”) process. However, it is unknown just how robust elemental production can be in mergers. Identifying signposts of the production of particular nuclei is critical for fully understanding merger-driven heavy-element synthesis. This talk will explore the properties of very neutron rich nuclei for which superheavy elements ($Z \geq 104$) can be produced in NSMs and whether they can similarly imprint a unique signature on kilonova light-curve evolution. A superheavy-element signature in kilonovae represents a route to establishing a lower limit on heavy-element production in NSMs as well as possibly being the first evidence of superheavy element synthesis in nature.

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Session Classification: Poster session (Core-collapse supernovae, mergers and the r -process)

Track Classification: Core-collapse supernovae, mergers and the r -process