2018 JINA-CEE Frontiers in Nuclear Astrophysics



Contribution ID: 10

Type: poster

Are Neutron Star Mergers Really the Dominant r-Process Site?

Wednesday, 23 May 2018 16:30 (1h 30m)

Neutron star mergers (NSMs) are popular candidates for being the dominant r-process site in the universe. Several arguments such as nucleosynthesis calculations, the recent gravitational wave detection GW170817 and its associated multi-wavelength electromagnetic emission, and galactic chemical evolution studies that require NSM rates similar to what is established by LIGO/Virgo, all point toward the idea that NSMs could be at the origin of the heaviest r-process elements. In this talk, however, I will focus on the current problems that are emerging from this idea. Besides the well known problem of the minimal delay time needed for NSMs to pollute metal-poor stars in the Galactic halo, there exist a deeper problem related to the temporal profile of the delay-time distributions of these events. Indeed, there is a serious discrepancy between the fields of galactic chemical evolution, binary population synthesis, and astronomical observations. In order to recover the decreasing chemical evolution simulations require a delay-time distributions for NSMs that are incompatible with population synthesis predictions and gamma-ray burst observations. I will review and describe the extent of this challenge, and discuss its implications on the quest to isolate the dominant site of the r process.

Primary author: Dr COTE, Benoit (Michigan State University / University of Victoria)
Presenter: Dr COTE, Benoit (Michigan State University / University of Victoria)
Session Classification: Poster Session