Contribution ID: **497** Type: **Invited talk in the parallel session**

Searching for strange quark planets

Wednesday, 7 July 2021 07:20 (20 minutes)

The central engine of gamma-ray bursts may be neutron stars. However, the internal structure of neutron stars is still largely uncertain. It has been suggested that strange-quark matter (SQM) may be the true ground state of hadronic matter, indicating that the observed pulsars may actually be strange stars (SSs), but not neutron stars. According to the SQM hypothesis, the existence of a hydrostatically stable sequence of SQM stars has been predicted, ranging from 1 to 2 solar mass SSs, to smaller strange dwarfs and even strange planets. While gravitational wave (GW) astronomy is expected to open a new window to the universe, it will shed new light on the search for SQM stars. We show that due to their extreme compactness, strange planets can spiral very close to their host SSs without being tidally disrupted. We thus can try to identify strange quark objects by searching for close-in pulsar planets. Additionally, Like inspiraling neutron stars or black holes, a merging strange star-strange planet system would serve as new sources of GW bursts, producing strong GWs at the final stage. The events occurring in our local universe can be detected by GW detectors, such as Advanced LIGO and the future Einstein Telescope. This effect provides a unique probe to SQM objects and is hopefully a powerful tool for testing the SQM hypothesis. In this talk, we will present our recent studies concerning strange quark planets.

Primary author: HUANG, Yong-Feng (Nanjing University)

Presenter: HUANG, Yong-Feng (Nanjing University)

Session Classification: Gamma-Ray Burst Correlations: Observational Challenges and Theoretical Interpretation

Track Classification: Fast Transients: Gamma-Ray Burst Correlations: Observational Challenges and Theoretical Interpretation