Contribution ID: **23** Type: **not specified**

A new tool on the workbench: studying GW progenitors with SEVN

Friday, 8 April 2022 11:30 (45 minutes)

In 2015, the LIGO/VIRGO interferometers detected the first gravitational wave (GW) signal coming from the merger of two black holes. Since then, about 90 merging binary compact
objects (BCOs), namely binary neutron stars and black holes, have been detected through GW signals. This wealth of new data provides us with crucial insight on the populations
of BCOs. For this reason, numerical tools to simulate the evolution of stars and binary processes leading to the formation of BCOs are needed.
In this talk, I present SEVN (Stellar Evolution N-body), a state-of-the-art population synthesis code we are developing in our group. The stellar evolution is implemented interpolating evolutionary tracks on the fly, while binary processes are simulated with analytic and semi-analytic prescriptions.
I will highlight what are the novelties and the key differences of SEVN with respect to other population synthesis code, especially regarding the computation of stellar evolution
and the prediction/correction adaptive time step schema. Examples of scientific exploitation of SEVN in the investigation of BCOs/GWs progenitors will be shown.
Finally, I will describe how the synergy between our group and Physics of Data students is helping in exploiting Machine Learning algorithms to assist SEVN and boost its capabilities.

Presenter: IORIO, Giuliano (University of Padua)

Session Classification: Astrophysics and Cosmology