Contribution ID: **21** Type: **Talk**

Understanding supernova kicks and black-hole spins in Galactic X-ray binaries

Tuesday 15 December 2015 17:51 (17 minutes)

In recent years, an increasing number of proper motions have been measured for Galactic black hole (BH) X-ray binaries (XRBs). When supplemented with accurate determinations of the component masses and spin rates, orbital period, and donor luminosity and effective temperature, these kinematical constraints harbor a wealth of information on the systems'past evolution. We developed an analysis that allows us to consider all this available information and reconstruct the full evolutionary history of XRBs back to the time of core collapse and compact object formation. The constraints on compact object progenitors and kicks derived from this are of immense value for understanding compact object formation and exposing common threads and fundamental differences between BH and neutron star formation.

Galactic field low-mass XRBs (LMXBs), like the ones for which BH spin measurements are available, are believed to form in situ via the evolution of isolated binaries. In the standard formation channel, these systems survived a common envelope phase, after which the remaining helium core of the primary star and the subsequently formed BH are not expected to be highly spinning. However, the measured spins of BHs in LMXBs cover the whole range of spin parameters from a˜*0 to a*1. In this talk I propose that the BH spin in LMXBs is acquired through accretion onto the BH during its long stable accretion phase. I find that in all Galactic LMXBs with measured BH spin, the origin of the spin can be accounted by the accreted matter. Furthermore, based on this hypothesis, I derive limits on the maximum spin that a BH can have depending on the orbital period of the binary it resides in, and give predictions on the maximum possible BH spin of Galactic LMXBs where a BH spin measurement is not yet available. Finally, I will discuss the implication that our findings have on the birth black hole mass distribution.

Primary author: FRAGKOS, Anastasios (University of Geneva)

Presenter: FRAGKOS, Anastasios (University of Geneva)

Session Classification: 15 - Binaries