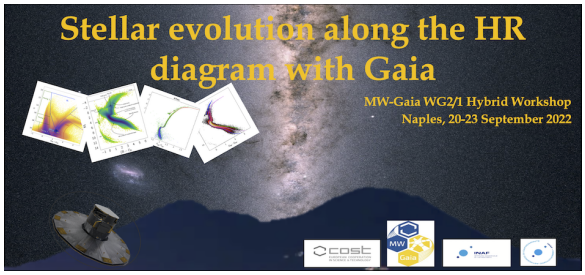

Contribution ID: **69** Type: **not specified**

Hunting for massive degenerate binaries with a black hole using Gaia

Thursday, 22 September 2022 11:30 (20 minutes)

Single-degenerate massive binaries containing a black hole (OB+BH) represent an important evolutionary phase on the pathway of becoming BH mergers. In the past two years, several OB+BHs were reported to exist on the basis of spectroscopic investigations. However, most reported OB+BH systems were later challenged by follow-up studies, demonstrating the extreme difficulty to identify BHs using spectroscopic data alone. On June 13th, the full third Gaia data release (DR3) was publicly released, providing us with the first Gaia astrometric orbits of binary systems.

In preparation for DR3, we have developed a unique method that allows for the identification of OB+BH systems in the Gaia binary catalogue. Assuming a direct collapse and no kick upon BH formation, we estimated that 200 OB+BHs could be identified using Gaia. Moreover, we showed that different BH-formation scenarios could lead to distinct period and eccentricity distributions. However, so far, we retrieved no OB+BH binaries in DR3 from the astrometric solutions.

In my talk, I will describe our methodology of extracting OB+BH binaries using Gaia DR3 solutions. I will demonstrate why the highly conservative filtering imposed by the Gaia collaboration led to a null detection, and how this can be remedied in the future.

Presenter: JANSSENS, S.

Session Classification: White dwarfs - Asteroseismology - Binaries