

Synthetic catalog of black holes in the Milky Way

We present a synthetic catalog of Galactic black holes (BHs) divided into disk, bulge and halo. To calculate evolution of single and binary stars we used updated population synthesis code StarTrack and new model of star formation history and chemical evolution of Galactic components. At the current moment Milky Way contains about 1.6×10^8 single BHs with average mass of about $13 M_{\text{sun}}$ and 9.3×10^6 BHs in binary systems with average mass of $19 M_{\text{sun}}$.

We present properties of BH population such as distributions of masses, velocities or numbers of systems in different evolutionary configurations.

The most massive BH, $130 M_{\text{sun}}$, originates from a star merger in a low metallicity stellar environment in halo. We constrain that only $\sim 0.005\%$ of total halo mass (including dark matter) could be hidden in the form of stellar origin BHs which are not detectable by current observation surveys. Galactic binary BHs are minority ($\sim 10\%$ of all BHs) and most of them are in BH-BH systems. We calculated current Galactic double compact objects (DCOs) merger rates for two models, which are: $3-81 \text{ Myr}^{-1}$ (BH-BH), $1-9 \text{ Myr}^{-1}$ (BH-NS), $14-59 \text{ Myr}^{-1}$ (NS-NS). We show how DCOs merger rates evolved since Galaxy formation till current time.

Primary authors: OLEJAK, Aleksandra (OA UW); BELCZYNSKI, Krzysztof (Copernicus Center, Polish Academy of Sciences); SOBOLEWSKA, Malgorzata

Presenter: OLEJAK, Aleksandra (OA UW)