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Coalescence of Black Holes with Low Mass Gap Objects in Globular Clusters through Binary-Single Exchanges ILIAS CHOLIS, Oakland University, KONSTANTINOS KRITOS, National Technical University of Athens — We study the merger rates of binary black holes in globular clusters that are among the most dense stellar environments and a natural place for the creation of black hole binaries. To model these systems with all their variations we rely on the observational properties of the known Milky Way globular clusters. We include interactions of black hole binaries with stars, with compact objects of mass between 2.5 and 5 solar masses (low mass gap objects) and with black holes as third bodies. Especially the soft interactions with stars accelerate the evolution of these binaries. We implement a simple model to evaluate the merger rate of black hole-low mass gap objects mergers formed in globular cluster-type environments. We start with star-star binaries and through successive binary-single exchanges end creating black hole binaries, black hole-low mass gap pairs and double low mass gap binaries. We monitor both the different populations of single compact objects, as well as the different combinations of star/low mass gap/black hole binary populations. We find that under proper conditions that exist in certain globular cluster environments, black hole-low mass gap mergers can take place at a rate suggested by the detection of GW190814 observed by LIGO's O3 run.

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