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Gravitational-Wave Signatures from Compact Object Binaries in the Galactic Center HUIYI WANG, University of California, Los Angeles, ALEXANDER STEPHAN, Ohio State University, SMADAR NAOZ, BAO-MINH HOANG, University of California, Los Angeles, KATELYN BREIVIK, Flatiron Institute — Almost every galaxy has a supermassive black hole (SMBH) residing at its center, the Milky Way included. Recent studies suggested that these unique places are expected to host a high abundance of stellar and compact object binaries. These binaries form hierarchical triple systems with the SMBH and undergo the eccentric Kozai-Lidov (EKL) mechanism. Here we estimate the detectability of potential Gravitational Wave (GW) emission from these compact objects within the frequency band of the Laser Interferometer Space Antenna (LISA) and Laser Interferometer Gravitational-Wave Observatory (LIGO). We generate a post EKL population of stars at the onset of Roche limit crossing and follow their evolution to compact object binaries. As a proof-of-concept, we adopt two metallicities, solar metallicity ($Z = 0.02$) and 15% of it ($Z = 0.003$). We demonstrate that over the observation timescale of LISA, black hole binaries (BH-BH) and white dwarf binaries (WD-WD) provides the most prominent GW sources via the EKL assisted merger channel. Systems involving neutron stars (e.g., NS-BH, NS-NS) are less observable but possibly abundant through different merger channels.

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