Abstract Submitted for the MAS15 Meeting of The American Physical Society

A Novel Approach for Rapidly Generating Supermassive Black-Hole Binary Populations Using the Schechter Function TREY MCNEELY, SEAN MCWILLIAMS, West Virginia University — Some simulations of the stochastic background of gravitational radiation due to supermassive black-hole binaries rely on a simple power law distribution in the chirp mass, a particular combination of the masses that determines the signal strength, to generate the population. The more physical Schechter function provides a more accurate population for individual black-hole masses, but using it to generate a chirp mass distribution poses several computational problems, including its large dynamic range and time complexity of generating a population from a distribution in the individual masses rather than the chirp mass directly. These problems can be overcome by numerically inverting the definition of chirp mass and generating a univariate chirp mass distribution from the bivariate Schechter function of the individual masses. This is a nontrivial task, but accomplishing it, as we will show, allows us to generate models for the full gravitational-wave signal much more efficiently.

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Date submitted: 02 Oct 2015

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