Abstract Submitted for the APR20 Meeting of The American Physical Society

Improved Modeling of EMRI Signal Confusion Noise for LISA DANIEL OLIVER, AARON JOHNSON, BEN RUSSELL, Univ of Arkansas-Fayetteville, LENA JANSSEN, JOEL BERRIER, University of Nebraska, Kearney, DANIEL KENNEFICK, Univ of Arkansas-Fayetteville — Scattering events around a supermassive black hole (SMBH) will occasionally toss a stellar-mass compact object (CO) into a highly eccentric orbit around the SMBH, this is known as an extreme mass ratio inspiral (EMRI). A single source of highly eccentric EMRIs is not likely to be detectable because gravitational waves are only emitted when the CO is very close to the SMBH. However, If we consider an ensemble of such sources, spread across the Universe, together they produce an unresolvable background noise that may obscure sources otherwise detectable by LISA, the proposed space-based gravitational wave detector. A previous study of this EMRI signal confusion background used a Newtonian order approximation and older models of SMBH and compact object populations. We seek to improve this characterization by implementing a frequency domain, Teukolsky based code (where necessary augmented by a semirelativistic approach) that can calculate highly eccentric orbits. Further, our group has used Illustris, a cosmological simulation software package, to improve on previous population models. Here we present some of the preliminary results of this study.

> Daniel Oliver Univ of Arkansas-Fayetteville

Date submitted: 10 Jan 2020

Electronic form version 1.4