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Music of the Spheres: the gravitational wave signal from exoplanets WILLIAM GABELLA, Vanderbilt University, KATELYN BREIVIK, CIERA and NorthWestern University, YILEN GOMEZ MAQUEO CHEW, Instituto de Astronomy UNAM, KELLY HOLLEY-BOCKELMANN, Vanderbilt University and Fisk University, BRITTANY KAMAI, California Institute of Technology — We focus on a gravitational wave source class that has been largely ignored: stellar-exoplanet systems. They have properties that put them in the frequency range of the Laser Interferometer Space Antenna (LISA), a joint ESA/NASA space-based gravitational wave mission set to launch in 2034. These systems are a billion times closer, if much less massive and therefore weaker wave emitters, than the easily detectable supermassive black holes, making exoplanets a potentially observable source class. With typical orbital periods of decades, most exoplanets would emit gravitational radiation at much lower frequencies than the current design of LISA. However, exoplanet surveys have unveiled a surprisingly rich variety of systems, from highly eccentric orbits to hot Jupiters to pulsar planets. Here, we investigate the gravitational wave signal from known exoplanets and predict the total signature of exoplanetary systems in the Milky Way.

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