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Pulsar-timing-array searches for stochastic gravitational waves vs Solar-System Ephemerides MICHELE VALLISNERI, Jet Propulsion Laboratory, Caltech, NANOGRAV COLLABORATION — The premiere source for pulsar-timing arrays such as the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) is the stochastic background from a population of inspiraling supermassive–black-hole binaries. The analysis of pulsar-timing data relies on the accurate knowledge of the motion of the Earth around the Solar-System barycenter. Current pulsar-timing-array datasets have become so sensitive that gravitational-wave–background upper limits and detection statistics are biased by the errors in current Solar-System ephemerides. NANOGrav developed a novel approach to marginalize search results over uncertainties in Earth's orbit, producing the first pulsar-timing-array constraints that are robust against ephemeris error. I describe this work and comment on expectations for the accuracy of future ephemerides, as well as prospects for pulsar-timing data to augment direct observations in determining the orbits of Solar-System bodies.

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