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Pulsar Signal Simulator JACOB HESSE, Univ of Washington, NANOGRAV COLLABORATION — Recent observations of gravitational waves (GW) have opened up a new field of gravitational astronomy. The North American Nanohertz Observatory for Gravitational waves (NANOGrav) collaboration aims to detect and study nanohertz GW using a Pulsar Timing Array made of millisecond pulsars. To help study the signal from these stars, a project called the Pulsar Signal Simulator (PSS) is being built by NANOGrav and is the focus of my research. The simulator is able to calculate a pulsar signal from source to detection. It starts with the initial signal of a pulsar and adds the different effects that alter the signal, before it reaches Earth. The coded in effects include *dispersion*, *scintillation*, and *scattering*. Each of these effects are results of the radio waves from the pulsar traveling through the interstellar medium. My project is to work on a portion of the PSS that takes, as input, the name of a known pulsar and simulates a signal with user-defined changes. I aim to increase efficiency as well as validate simulation output. This project is beneficial to NANOGrav by characterizing the noise in our galactic scale GW detector. Progress in GW astronomy will allow for deeper insight into galaxy evolution, black holes, and the early history of the universe.

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