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Forward-Modeling Helioseismic Signatures ANDREY STEJKO, ALEXANDER KOSOVICHEV, New Jersey Inst of Tech, VALERY PIPIN, Institute of Solar-Terrestrial Physics — Understanding the internal workings of the Sun has always been a difficult task–as the solar interior will most likely be forever inaccessible to direct observations. The discovery of turbulent oscillations of plasma on the solar surface, however, have offered us a new chance to take a look inside, using the same techniques in seismology that are used here on earth. This new field of helioseismology has since become one of the foundational pillars of solar astrophysics, bringing us a wealth of insights into the internal workings of global plasma flows that drive the dynamo generating the solar magnetic field. Many mysteries still remain, however, as noise and systematic errors dominate the helioseismic signals–leading to inconsistent interpretations of observational data. In order to address these uncertainties, we have developed a new 3D global acoustic model of the Sun (GALE–Global Acoustic Linearized Euler), which can be used as a computational test-bed to forward-model local and global techniques in helioseismology across various 3D structures of velocity flows and noise models. This model will help set a baseline that will lead to better interpretations of the signals we observe on the Sun.

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