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Modeling Detached Magnetic Structures in the Inner Heliosphere

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Currently, the WSA-ENLIL-Cone modeling system is used by various space weather agencies for operational forecasting of corotating and transient solar wind disturbances in the inner heliosphere. This modeling system provides global context and arrival times of the solar wind streams and coronal mass ejections (CMEs) to Earth, planets, and spacecraft. Such predictions are running continuously and much faster than real time. However, CME-like disturbances are generated by launching hydrodynamic transients and thus it is not possible to predict the southward magnetic field (-Bz).. In this presentation, we use a 3-D analytic model of the magnetic spheromak, launch it into the background solar wind at 0.1 AU and simulate their evolution in the inner heliosphere as the first step in modeling more realistic transient disturbances. Main advantage above hydrodynamic ejecta is in smaller distortion/compression due to magnetic field tension and in more realistic density profiles. We will compare these new simulations with the original one, produce by hydrodynamic ejecta, and we will also show differences on synthetic white-light J-maps as might be observed by heliospheric imagers. modeling system would enable routine operational modeling of the heliospheric space weather event-by-event and faster than real-time