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Modeling-challenge paradigm using design of experiments for spacecraft immersed in nonstationary, between-regimes, flowing plasma ME KOEPKE, West Virginia Univ, R MARCHAND, Univ of Alberta — A conducting sphere and cylinder under the conditions of nonstationary, between-regimes, flowing plasma is adopted as a test case for a modeling-challenge paradigm based on design of experiments (DOE) methodology that merges numerical simulation and testing. This model/simulation development platform facilitates a red-team/blue-team style challenge aimed at a tailored set of standard experimental conditions and measurements addressing specific questions in spacecraft-environment interactions and assessing the capability of models to describe those conditions. The goal is streamlining the Model/Simulation development process. A byproduct is an enhancement of the interrelationship between experiments in the laboratory and in space. Here, we conceptualize the advantage of the model-challenge over conventional validation in advancing whole-device modeling objectives in basic and applied plasma science.

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