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Puzzling Results from a new Spacecraft Plasma Sensor Experiment STEVEN OWENS, United States Air Force Academy — Current space plasma sensors require multiple high voltage power supplies and a spinning spacecraft to acquire a full reading of the surrounding plasma. These requirements drive the cost of launching space plasma sensors higher, decreasing their true effectiveness (no launches means no data). To resolve this issue, a new design for plasma spectrometers is needed. Such a device must be capable of taking ultrafast measurements using only one high voltage power supply. One solution, designed by Los Alamos National Laboratory, is called the 2-Pi Plasma Spectrometer, or 2PiS. During the first phase of the project, a prototype was built to compare proof of concept against simulated data. Testing the prototype produced an odd result: the prototype performed better than the simulation predicted. To understand why this occurred and to exploit the problem in the future, the background theory was tested in the simulation. After the equations proved to be correct, internal parts of the 2PiS were skewed from perfect in a simulation to see what effect this would have. While skewing the plates does have some effect, no single skew could cause the difference seen in the data.

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