

Primary simulation and experimental results of a coaxial plasma accelerator

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A coaxial plasma accelerator with a compressing coil is developed to simulate the impacting and erosion effect of space debris on exposed materials of spacecrafts. During its adjustment operation, some measurements are conducted including discharging current by Rogowski coil, average plasma speed in the coaxial gun by magnetic coils and ejected particle speed by piezoelectric sensor, etc. In concert with the experiment a primary physical model is constructed, in which only the coaxial gun is taken into account with the compressor coil not considered for its unimportant contribution to the plasma ejection speed. The calculation results by the model agree well with the diagnostic results considering some assumptions for simplification. Based on the simulation result, some important suggestions for optimum design and adjustment of the accelerator are obtained for its later operation.