

Numerical calculation on the performance of plasma particle analyzer with the boundary-fitted coordinate system

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For the development of plasma particle (ion/electron) analyzer, it is necessary to calculate the electric field and trajectories of particles in the analyzer with high accuracy. The calculation, however, requires an extremely large number of grid points when we use the Cartesian coordinate system. Therefore the effect of small structures such as serrations to reflect the incident solar ultra-violet radiation has been empirically estimated in the past.

In this paper, we have applied the boundary-fitted coordinate system to the calculation. The method enables us to calculate the field and trajectories even in the presence of serrations with a fine structure. The effect of serrations is numerically calculated with this method.

We will show the result of calculation on troidal top-hat electrostatic analyzer with electrostatic deflectors at the entrance part of the analyzer and serrations on troidal plates of the analyzer.