

Effects of finite electrode area ratio on Langmuir probe measurement

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Langmuir probe(LP) is a widely used instrument for measuring electron density and temperature on satellites and rockets. Recently pico- and nano- satellites have become more popular, when the surface area of satellite is similar to the probe, the effects on LP measurement due to limited satellite surface area need to be considered, and these effects may cause LP measurement inaccurate. We have investigated the effect of satellite surface area, satellite and probe contamination and LP sweeping frequency in laboratory. Also we have found that the satellite and probe voltage will decrease when a large quantity of electrons are attracted by probe voltage and the contamination effect of satellite surface becomes major.

In summary, a solution to these problems is suggested.

Keywords: Langmuir probe, finite electrode area ratio, electrode surface contamination, pico/nano-satellite, electron temperature, electron density