

MONO-POLARIZATION DETECTOR OF POSITIVE AND NEGATIVE PARTICLES OF A PLASMA

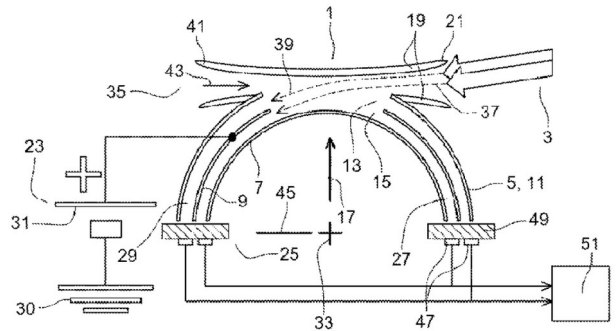
Technological advantages

- Reduced sensor footprint
- Only one electrode is required
- Reduction in electrostatic arc appearance
- Simultaneous measurement of positive and negative charges

Invention synthesis

The invention deals with a mono-polarization sensor in a plasma for positive and negative particles. Knowing the ambient plasma properties in a satellite vicinity is important to characterize the flux and energy of plasma particles and to measure its electrostatic charge.

The sensor is composed of a collimator (cover) placed on top of a spherical (or elliptical) head with an internal and external wall separated by an intermediate wall. The external and intermediate walls are opened to let the plasma flux flow in. The positive charges enter the internal gap while the external charges enter the external gap. The intermediate wall (the electrode) has a sweeping high tension (x1000 V) polarity and separates each species in each gap. Counting units measure the charges quantities in each gap. The top cover and the sensor head shapes facilitate the entry of the tangential ambient flux at the sensor opening.



Invention schematic representation

- 1) mono-polarization sensor
- 3) plasma
- 5) hemispherical head
- 7) internal wall, 9) intermediate wall, 11) external wall
- 13) external opening, 15) intermediate opening
- 19) top cover
- 21) inlet opening
- 23) high tension (positive, negative) set-up
- 25) counting unit (positive, negative charges)
- 27) internal gap, 29) external gap
- 30) grounding
- 31) high tension card
- 35) circular inlet slit
- 51) Power and command unit

Commercial benefits

- Reduced weight and size : simplified sensor integration
- Improved safety by reducing electric arc risks

Potential applications

- Satellites : characterization of the ambient plasma environment

Patented invention - under license.