

Field Measurements

Comment on Question 4.

By comparing the wave frequency with the fundamental frequencies we found that the wave frequency is smaller than the electron gyrofrequency and plasma frequency and larger than the proton gyrofrequency. This means that the wave is not associated with the ions, since they are too slow, but instead the electrons are the ones responsible for the wave.

Particle Measurements

Comment on Question 2.

All the elements of the solar wind move with the same velocity and its composition is the same all the time, protons (H ions) and Helium ions. The mass of the Helium is 4 times bigger than the mass of a proton but its charge is only two times bigger than the charge of a proton. Given that the velocity is the same for all the elements, the amount of energy of the elements depends on the mass of the particles. Now, the instrument measures the E/q relationship and not the energy of the particles by themselves. Therefore, the E/q value measured for the Helium should be the double than the value that is measured for protons.

Comment on Question 5.

From the energy spectra plots for orbit 1069, it can be seen two peaks clearly indicating the presence of two different elements on the solar wind. The peak at the higher energy level (1536 eV) will correspond to the Helium. The E/q relationship is two times larger for the Helium than for the proton and the mass of the Helium is 4 times larger than the mass of the proton. Since we know E/q , it is possible to calculate the energy but also it is necessary to E/q relationship between proton and Helium into account. Once knowing the Energy then it is necessary to consider the mass including the 4 time relationship between proton and Helium and with that it is possible to know the velocity. Once done all this, it gives that the velocity of the Helium ion is 383.511 km/s. Which is similar to the velocity already calculated for the protons on the previous question.

On the energy spectra for orbit 1070, it can be seen just one peak, this means that there is only protons on the solar wind and no Helium ions are there.