A new approach to solar wind monitoring

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The monitoring of solar wind parameters is a key problem of the space weather program. We are presenting a new solution of plasma parameter determination suitable for small and fast solar wind monitors. The first version will be launched in frame of the SPECTR-R project into a highly elongated orbit with apogee $\sim$ 350 000 km. The method is based on simultaneous measurements of the total ion flux and ion integral energy spectrum by six identical Faraday cups. Three of them are dedicated to determination of the ion flow direction, whereas other three equipped with control grids supplied by a retarding potential are used for determination of the density, temperature, and speed of the plasma flow. The version under development is primarily designed for the measurements in the solar wind and tail magnetosheath, thus for velocities range from 270 to 750 km/s, temperatures from 1 to 30 eV, densities up to 200 cm^{-3}, and assuming the angle of incidence up to 20° from the Sun-Earth line. However, the instrument design can be simply modified for measurements in other regions with a substantial portion of low-energy plasma as a subsolar magnetosheath, cusp or LLBL. A preliminary testing of the engineering model shows that the proposed method can provide reliable plasma parameters with a high time resolution (up to 8 Hz). The contribution presents not only the method its technical realization but it documents all advantages and peculiarities of the suggested approach.