
Why do we study the solar wind?

By J. De Keyser

The solar wind is an important research topic for astronomers. There are indeed a large number of phenomena, which they do not (or only partially) understand. For example, our understanding of the flow of a collection of charged particles in a magnetic field (just like in the solar wind) is still very incomplete. One hopes that a better understanding of the Sun and the solar wind will give us insight in the behaviour of stars and stellar winds elsewhere in the universe.

Studying the solar wind also has a number of practical objectives. Since the solar wind fills the space between the planets, it is important to know its main characteristics when we want to travel through this environment with spacecraft. Besides that, the solar wind is a determining factor for the immediate environment of the Earth. Fortunately, our Earth has a magnetic field that can stop the biggest part of the charged particles of the solar wind. Yet, some of these particles are able to enter the atmosphere, where they cause, for example, polar lights. Once in a while also "storms" occur. In 1991, as a consequence of such a storm, large parts of Canada and the United States experienced a major power failure. Variations in the solar wind cause electric storms and corrosion in the many kilometre long pipelines of Alaska. Storms disturb radio transmissions, and also space travel has to deal with certain consequences. The charged particles of the solar wind can be compared to radioactive radiation. It isn't the first time that a satellite breaks down due to the intense radiations during a storm. And of course astronauts can be exposed to a certain dose of ionizing radiation, in particular during a long duration stay in space.

For physicists, the solar wind is a big laboratory for research into the behaviour of a collection of charged particles (a plasma). Moreover, a lot of connections exist between the study of the solar wind and terrestrial applications, like controlled nuclear fusion.

