

Progress in Understanding the Dynamics of the Solar Wind

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The solar wind (SW) drives essentially all of space plasma dynamics. Without it space would be empty with occasional cosmic ray zipping through. Most of the solar SW observations have come near 1 AU, but Helios measured the SW close to the Sun at distances of 0.3 AU and Ulysses out of the ecliptic plane over both poles. More recently, Voyagers observed the SW to the end of the heliosphere. "Solar wind" is a generic term referring to particles escaping from the Sun. Solar wind can have many different forms, including slow, fast and turbulent flows associated with coronal holes, ICMEs and CIRs. The sources of the various SW are thus different and complicated, and velocity, composition and temperatures of He⁺⁺ to H⁺ can depend strongly on where the SW originates. Existing models can explain some of the observed features but there are still many unanswered questions. The basic properties of the SW are not only important for understanding the dynamical processes but also for developing improved and new theoretical models. We will discuss how our observations of the SW have progressed during the last fifty years and conclude with suggestions for further improvements.