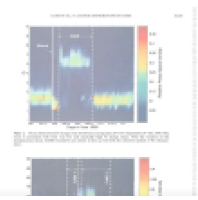
Back

1

2

3

4



JOURNAL OF GEOPHYSICAL RESEARCH, VOL

Iron charge distribution as an identif of interplanetary coronal mass ejectio

S. T. Lepri,[1] T. H. Zurbuchen,[1] L. A. Fisk,[1] I. G
H. V. Cane,[3] and G. Gloeckler[1,2]

Abstract. We present solar wind Fe charge state da
Composition Explorer (ACE) from early 1998 to the
states in the solar wind are typically around 9+ to 1
average charge states occur, including intervals with
consistently associated with interplanetary coronal m
the Fe charge state distribution we are able to extrac
exceeding 2×10^6 kelvins. We also discuss the temp
the more frequent appearance of periods with high I
increases.

1. Introduction

The material injected into the solar wind following coro
mass ejections (CMEs) at the Sun plays an important role
the interaction of the Sun with the Earth and its magne
sphere [*Gosling et al.*, 1974; *Webb and Howard*, 1994; *How
et al.*, 1997]. The in situ identification and investigation of t
material (often called interplanetary CMEs (ICMEs)) is the
fore relevant for this aspect of space physics. Various sig
tures characteristic of ICMEs have been reported [e.g., *G
ling*, 1990, and references therein; *Neugebauer et al.*, 1997],
the specific signatures displayed by individual ICMEs obser
at the Earth show considerable variation. Models predict t
CMEs may be structured, containing spatially distinct plas
populations close to the Sun [*Antiochos*, 1998]. In additi
ICME observations at 1 AU show that ICMEs may cont
multiple structures with different particle populations [e
Haggerty et al., 2000; *Skoug et al.*, 2000; *Osherovich et al.*, 199
As a result, observed signatures may depend on whether
ICME center or the ICME edge passes the spacecraft a
upon physical properties close to the Sun. Consequently, i
very hard to define a complete set of necessary and sufficie
conditions under which ICME plasma can be identified.

An important ICME signature is the presence of bidir
tional suprathermal electrons [*Gosling et al.*, 1987]. As a CM
is ejected from the Sun, the magnetic field lines embedd
within the plasma remain attached to the solar corona ev