

Self-consistent Alfvén wave transmission impact on the CIRs shock in the Heliosphere

X.Wang(1)and Y.Yan(1)

(1)NAOC,Beijing,(wangxin@bao.ac.cn)

The transmission of Alfvén-waves at quasi-parallel shocks is treated self-consistently, i.e., taking the pressure and energy flux exerted by the waves into account when determining the shock's gas compression ratio. The resulting 'test-particle' scattering-center compression ratio r_k is different from the gas compression ratio r . For some conditions, it may get very large values that result in an extremely hard test-particle-energy spectrum of the energetic particles accelerated at the shock in Corotating Interaction Regions(CIRs) in heliosphere. Since the conventional diffusive shock wave acceleration models in CIRs did not included Alfvén wave effect, we apply a modified Fermi diffusive acceleration model to the CIR shocks and obtain a new result by take into account Alfvén wave effect in Rankine-Hugoniot relations. This new result can provided a good agreement with the observed energetic particles spectral index by Ulysses.