

COMPRESSIVE-DIFFUSIVE ACCELERATION OF ENERGETIC CHARGED PARTICLES

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We discuss the phenomenon of the acceleration of charged particles in a compressing diffusive medium and apply it to recent ACE observations in the interplanetary medium. It has been recognized that the phenomenon of diffusive shock acceleration can readily be generalized to the case where the shock is replaced by a gradual change in the velocity of the flow over a length scale L . Let U be the flow speed and κ the energetic particle diffusion coefficient normal to the plane of the compression. Then, if the dimensionless parameter $\kappa/(UL)$ is large compared with unity, the energetic particles are accelerated much as in diffusive shock acceleration. We have applied this to the case of a co-rotating interaction region near the Sun, where it has not yet developed into a shock. We find significant acceleration of charged particles. Our results are compared with recent observations carried out on the ACE spacecraft.