PARTICLE ACCELERATION BY CASCADING ALFVEN WAVE TURBULENCE

David Eichler

Department of Physics, Ben-Gurion University of the Negev

Particle acceleration by cascading Alfven wave turbulence was suggested (Eichler, 1979) as being responsible for energetic particle populations in ^{3}He-rich solar flares. In particular, it was noted that the damping of the turbulence by the tail of the particle distribution in rigidity naturally leads to dramatic enhancement of pre-accelerated species - as ^{3}He is posited to be - and superheavy elements. The subsequent detection of large enrichment of ultraheavies, relative to iron, has apparently confirmed this prediction, lending support to the original idea. It is shown here that this picture could be somewhat sharpened by progress in understanding the 3-dimensional geometrical details of cascading Alfven turbulence (Sridhar and Goldreich, 1995). The mechanism may be relevant in other astrophysical environments where the source of turbulence is non-magnetic, such as cluster of galaxies.