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## **A New Mechanism of Magnetic Field Generation in Supernova Shock Waves and its Implication for Cosmic Ray Acceleration**

### **Abstract content**

We discuss the diffusive acceleration mechanism in SNR shocks in terms of its potential to accelerate CRs to  $10^{18}$  eV, as observations imply. One possibility, currently discussed in the literature, is to resonantly generate a turbulent magnetic field via accelerated particles in excess of the background field. We analyze some problems of this scenario and suggest a different mechanism, which is based on the generation of Alfvén waves at the gyroradius scale at the background field level, with a subsequent transfer to longer scales via interaction with strong acoustic turbulence in the shock precursor. The acoustic turbulence in turn, may be generated by Drury instability or by parametric instability of the Alfvén (A) waves. The essential idea is an  $A \rightarrow A+S$  decay instability process, where one of the interacting scatterers (i.e. the sound, or S-waves) are driven by the Drury instability process. This rapidly generates longer wavelength Alfvén waves, which in turn resonate with high energy CRs thus binding them to the shock and enabling their further acceleration.

**If this paper is presented for a collaboration, please specify the collaboration**

### **Summary**

### **Reference**

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