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### **Current Status of Shock Acceleration Theory**

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The main features of nonlinear diffusive shock acceleration are now reasonably well understood after several decades of work by many individuals. Several distinct approaches have converged to give a reasonably consistent picture of the process. These will be briefly described. The interesting new development in the last few years is the increasing attention being paid to mesoscopic instabilities and their potential importance for magnetic field amplification, This may well be the last missing piece of the jig-saw, but raises serious technical problems for the theoretical study of the acceleration process as well as some fascinating physics issues.