

Astrophysics > Galaxy Astrophysics

On saturation of betatron acceleration of dust particles behind shock fronts

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Possible saturation of betatron acceleration of dust particles behind strong shock fronts from supernovae is considered. It is argued that the efficiency of the nonthermal dust destruction should be substantially lower than the value estimated from a traditional description of betatron acceleration of dust grains behind radiative shock waves. The inhibition of the nonthermal destruction can be connected with the mirror instability developed in the dust component behind strong shocks with the velocity 3 times exceeding the Alfvén speed. The instability develops on characteristic time scales much shorter the age of a supernova remnant, thus its influence on the efficiency of dust destruction can be substantial: in the range of shock velocities $100 \text{ km s}^{-1} < v_s < 300 \text{ km s}^{-1}$ the destruction efficiency can be an order of magnitude lower than normally estimated.

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