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The active Sun and its implication for the heliosphere
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Monte Carlo simulations of solar flare proton transport through self-generated waves

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We perform Monte Carlo simulations to study the transport of flare-generated energetic protons through self-generated Alfvén waves in the low corona. We consider protons propagating inside an open flux tube after being released isotropically from a small-sized source located in the flux tube. While moving in the tube the particles experience resonant scattering off Alfvén waves, giving rise to an increase in the wave intensity. Particles are assumed to be absorbed if they reach the solar surface and escaped if they reach the opposite end of the simulation domain, taken to be connected to the interplanetary medium. Under conditions corresponding to strong particle acceleration, the proton release can have a two-component structure. One of the components is formed by fast protons that experience quite weak scattering off the background spectrum of waves, and the other one is associated with protons trapped by the amplified intensities of Alfvén waves.