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Ion acceleration in 3D guide field magnetic reconnection QILE ZHANG, Los Alamos National Laboratory, JAMES DRAKE, MARC SWISDAK, University of Maryland College Park, JOEL DAHLIN, NASA Goddard — Magnetic reconnection can acceleration ions to up to GeV energy in solar flares but the ion acceleration mechanism is still unclear. Previous 3D particle-in-cell guide field reconnection simulations suggest that electrons have stronger acceleration in 3D than 2D due to enhanced 3D transport to access more fermi reflection regions, but mysteriously ions acceleration in 3D is suppressed compared to 2D. By further analysis and particle tracking in these simulations, we find that the fermi slingshot effect in 3D is weaker than 2D due to the 3D entangled turbulent field lines, which reduces the energy conversion from the fermi mechanism of both ions and electrons. Energetic ions are accelerated by the fermi mechanism like energetic electrons, but they travel much slower than electrons and thus they cannot make full use of the 3D transport like energetic electrons to overcome the weaker slingshot effect in 3D, resulting in a reduced acceleration than 2D.

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