Localized energy cascade driven by Magnetic Reconnection: a Coarse Graining approach

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Résumé

Magnetic Reconnection (MR) is a fundamental and ubiquitous process in space plasmas allowing the reconfiguration of magnetic field lines, strong particle energization and heating. In this work we employ the Coarse-Graining (CG) approach, a powerful tool that allows studying locally ({*in space*}*) the energy cascade, to underline how MR plays a major role in driving turbulence at sub-ion scales.*

The CG quantity \$π_ℓ({x})\$measurestheenergytransferrateacrossscale\$ℓ\$atposition\${x}\$, whichisparticularlyconver scaleenergytransfer.

ApplicationstoHybrid−Vlasov−Maxwellnumericalsimulationsandto{in−situ}satelliteobservationshowanintenseener d_i\$atthereconnectingsiteswhilenonetolittleenergytransferispresentatlargerscalesandatnon−reconnectinglocations. Thisworkdemonstratesthatreconnectingcurrentsheetsinjectenergydirectlyatscalescomparableto\$d_i\$, whichisthentra ionturbulenceeven intheabsenceoftheMHDinertialrange.

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sciencesconf.org:pnst-2022:399715