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Kinetic Particle-in-Cell (PIC) simulations of magnetic reconnection in the turbulent magnetosheath

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The Earth's magnetosheath is composed by a strongly turbulent plasma downstream the Earth's bow shock. In this region, very thin current sheets reaching electron-scales form out of the turbulence, and there is evidence that magnetic reconnection can still operate despite of the dominance of thermal over magnetic pressure (high-β plasma regime), a behavior poorly understood. In order to get a better insight of this process, we carried out a set of 2.5D fully-kinetic Particle-in-Cell (PIC) code simulations of magnetic reconnection in electron-scale current sheets embedded in a high-β plasma. We calculate the resulting electron and ion heating and the non-thermal features in dependence on the current sheet width and plasma-β, and their relation with kinetic instabilities and turbulence. Our findings in this so far unexplored parameter regime can improve the understanding of the consequences of magnetic reconnection events currently being measured by the MMS spacecraft in the Earth's magnetosheath.