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Effects of the temperature on the reconnection properties

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In magnetized plasma systems, magnetic reconnection is the most important process in converting the magnetic energy into the kinetic energy of plasma. It is conventionally thought that the outflow speed and the reconnection rate depend only on the strength of the upstream magnetic field and the upstream plasma density. However, using fully kinetic particle-in-cell simulations of collisionless reconnection with different values of temperature, we show surprising results that, unlike the conventional belief, the outflow speed and the reconnection rate decrease when the temperature increases. The physics of these unexpected results will also be discussed.

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