# LIMIT LAWS IN EXCLUSION PROCESSES WITH DISCONTINUITY

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We consider the asymmetric simple exclusion process (ASEP) on the integers. After reviewing some known results for the totally ASEP, we consider the general ASEP with an initial data such that in the large time particle density $\rho(\cdot)$ a discontinuity at the origin is created, where the value of $\rho$ jumps from zero to one, but $\rho(-\varepsilon), 1-\rho(\varepsilon) > 0$ for any $\varepsilon > 0$. We consider the position of a particle $x_M$ macroscopically located at the discontinuity, and show that its limit law has a cutoff under $t^{1/2}$ scaling, $t$ the observation time. Inside the discontinuity region, we show that a discrete product limit law arises, which bounds from above the limiting fluctuations of $x_M$ in the general ASEP, and equals them in the totally ASEP.