Séminaire de physique mathématique

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Lundi 06/12/2021, 11:00

Orme des Merisiers Salle Claude Itzykson, Bât. 774

Blast and splash in the one-dimensional cold gas

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We study the response of the one-dimensional hard-point gas of particles at rest when one particle suddenly starts moving. The outcome is the flow between shock waves advancing as $\pm t^{2/3}$. The density, velocity, and temperature in the growing region between the shock waves approach to scaling forms predicted by Euler equations; deviations from the predictions of non-dissipative hydrodynamics arise in the central region growing as $t^{38/93}$. More rich behaviors are found in the semi-infinite setting when the left-most particle suddenly starts moving to the right. A shock wave propagates to the right, and a growing number of "splatter" particles penetrate the initially empty half-line. The total energy and momentum of the splatter particles exhibit counter-intuitive behaviors.