

Saturation of turbulent flows by suspended particles: a mathematical mode

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It is known that the suspension of heavy particles in a turbulent flow suppresses turbulence and increases velocities. This may lead to dramatic events, such as extreme wind speeds in hurricanes and dust and fire storms. It is important to understand in which circumstances the suspension of particles leads to such significant increase of flow velocities. We show that this occurs in the regime of limiting saturation, when the flow suspends as many particles as the given external conditions allow. Based on the Kolmogorov-Barenblatt model for turbulent flows with suspended particles, we present a precise characterisation of this regime.

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