

Abstract Submitted
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Single drop fragmentation is the source of raindrops size distribution EMMANUEL VILLERMAUX, BENJAMIN BOSSA, Aix-Marseille Universite, IRPHE — Like many natural objects, raindrops are distributed in size. By extension of what is known to occur inside the clouds, where small droplets grow by accretion of vapor and coalescence, raindrops in the falling rain at the ground level are believed to result from a complex mutual interaction with their neighbors. We show that the raindrops polydispersity, generically represented according to Marshall-Palmer's law, is quantitatively understood from the fragmentation products of non interacting, isolated drops. Both the shape of the drops size distribution, and its parameters are related from first principles to the dynamics of a single drop deforming as it falls in air, ultimately breaking into a dispersion of smaller fragments containing the whole spectrum of sizes observed in rain. The transformation is accomplished within a timescale much shorter than the typical collision time between the drops.

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