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Collision between ellipsoids settling in a turbulent flow ALAIN PUMIR, Ecole Normale Superieure de Lyon, JENNIFER JUCHA, Projekttrger Juelich, Juelich Forschungszentrum, Germany, AURORE NASO, EMMANUEL LEVEQUE, LMFA, Ecole Centrale de Lyon, Ecully, France — Nucleation of droplets and ice-crystals, starting from aerosols, leads in clouds to the formation of very small particles, whose size has to grow by orders of magnitude to become rain drops or hail particles. The growth of droplets in warm clouds (in the absence of ice crystals) has recently received much attention. Here, I will discuss the problem of settling and collision of ice crystals in a turbulent environment. In the temperature range -20C <T <-10C, the crystals shapes can be approximated as very thing oblate ellipsoids, with a size smaller than the size of the smallest eddies (Kolmogorov scale). Neglecting completely the inertia of the fluid, I will show that the crystals tend to settle predominantly with their face first. The orientation bias of the crystals is particularly strong when turbulence intensity is low. When the flow Reynolds number is moderate, the collisions between crystals results essentially from the difference in the settling velocities, due to the different orientation (the settling velocity depends on the crystal orientation). The role of turbulence in determining the collision rate becomes prevalent when the Reynolds number increases.

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