

Abstract Submitted
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Experimental study of snow friction CAROLINE COHEN, LadHyX, Ecole Polytechnique, LUCA CANALE, ALESSANDRO SIRIA, Team Micromega, Ecole Normale Supérieure, DAVID QUERE, LadHyX, Ecole Polytechnique, LYDERIC BOCQUET, Team Micromega, Ecole Normale Supérieure, CHRISTOPHE CLANET, LadHyX, Ecole Polytechnique — Snow friction results from the interplay of different physical processes: solid friction of granular material, phase change and lubrication, heat transport, capillarity, elasticity and plasticity. The multiple conditions of temperature, humidity and density of the snow result in different regimes of friction. In particular, there is an optimal amount of melted water to lubricate the contact between the ski sole and the snow grains. The thickness of the water layer depends on temperature, speed... A huge variety of waxes have been empirically developed to adapt the amount of water to the conditions of skiing, but remain mysterious. In these study, we investigate experimentally the mechanisms of snow friction at different scales: first, the friction of a ski on snow is measured on a test bench, depending on the snow characteristics and for different waxes. Then microscopic experiments are led in order to understand the friction at the ice crystals scale.

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