Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Drop Impact on Superhydrophobic Electrospun Nanomats[1]
ALEXANDER YARIN, University of Illinois at Chicago, ANDREAS LEMBACH, ILIYA ROISMAN, TATIANA GAMBARYAN-ROISMAN, CAMERON TROPEA, PETER STEPHAN, Center for Smart Interfaces, Technische Universität Darmstadt, Germany — Experiments were conducted to study peculiarities of drop impact on electrospun polymer nanofiber mats. The nanofiber cross-section diameters were of the order of several hundred nanometers, the pore sizes in the mats of about several microns. Polymers which are partially wettable by water, and non-wettable by water were used to electrospin nanofiber mats. The experiments revealed that drop impacts on nanotextured surfaces of nanofiber mats produce spreading similar to the one on impermeable surfaces. However, at the end of the spreading stage the contact line is pinned and drop receding and bouncing is completely prevented. At higher impact velocities, prompt splashing events with formation of tiny drops were observed. It was shown that the well-known splash parameter K_d can be used as an acceptable scaling for splashes, however the threshold value of number$K_{d,s}$for the nanomats is higher than that for dry flat substrates. The enhanced efficiency of drop cooling in the presence of nanofiber mats was also observed experimentally.

[1]Supported by National Science Foundation through Grant NIRT CBET-0609062, DFG (German Science Foundation).

Alexander Yarin
University of Illinois at Chicago

Date submitted: 30 Sep 2009 Electronic form version 1.4