Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Stick-slip during the peeling of adhesive tape MARIE-JULIE DALBE, STEPHANE SANTUCCI, Laboratoire de Physique, Ecole Normale Superieure de Lyon, LOIC VANEL, LPMCN, CNRS UMR 5586, PIERRE-PHILIPPE CORTET, Laboratoire FAST, CNRS UMR 7608 — Using a high-speed camera, we study the instable peeling dynamics of an adhesive tape pulled at an imposed controlled velocity - focusing on the stick-slip regime of the peeling. Thanks to high-resolution fast camera, we can observe directly the peeling point motion and thus quantify the details of the stick and slip phases. To study properly the influence of peeling angle on stick-slip dynamics, we have developed an original experimental set-up where we are able to control the peeling angle while peeling the adhesive from a plane substrate. In this geometry, we extracted the stick and slip periods and studied their evolution with the peeling speed V, the length between the detachment zone and the peeling motor L, and the peeling angle θ. We observe that the stick and slip periods increase non-linearly with L. We report various regimes depending on V, with periods of Stick and Slip either independent or proportional to V. These experiments confirmed that the physics of adhesive peeling is strongly dependent on θ, especially in the Stick-Slip regime. This general feature questions the correct fracture criterion to consider at the peeling point in order to model the Stick-Slip adhesive peeling.

Marie-Julie Dalbe
Laboratoire de Physique, Ecole Normale Superieure de Lyon

Date submitted: 04 Dec 2012 Electronic form version 1.4