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Stress relaxation in thin crumpled sheets INGO DIERKING, PAUL ARCHER, University of Manchester — Compression of thin crumpled sheets subjected to a constant weight shows a wide range of scaling, covering up to five orders of magnitude [1], i.e. time scales from seconds to weeks. We demonstrate that this scaling behaviour is not smooth, but rather interrupted by sudden changes in height of the uniformly compressed crumple, which we attribute to sudden ridge collapses. Interestingly, when plotting the time laps between successive discontinuous ridge collapses as a function of time, the data falls onto a single linear functionality for all polymer film thicknesses, with a slope of $d\Delta t/dt=1$ over a scaling regime of four orders of magnitude.[2] Further, we investigate the scaling behaviour of thin sheets of different metals to elucidate a possible relation between the scaling parameter and the Young's modulus. Preliminary experiments suggest that scaling is a linear function of the elastic modulus. [1] K. Matan, R.B. Williams, T.A. Witten, S.R. Nagel, Phys. Rev. Lett., **88**, (2002), 076101. [2] I. Dierking, P. Archer, Phys. Rev. E, **77**, (2008), 051608.

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