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Local contact stress measurements at a rough interface JULIEN SCHEIBERT, ALEXIS PREVOST, EYTAN KATZAV, MOKHTAR ADDA-BEDIA, GEORGES DEBRÉGEAS, LPS-ENS, CNRS-UMR 8550 Paris, France, JOEL FRELAT, LMM, CNRS-UMR 7607, Paris, France — An original MEMS-based force sensing device has been designed. It allows for spatially resolved measurements of both normal and tangential stress fields at the base of an elastomeric film in contact with a rigid substrate [1]. Model contact geometries involving a rough, nominally flat film pressed against smooth spherical and cylindrical glass substrates have been studied, in two different regimes, normal indentation and steady sliding. The measured stress profiles have been compared to calculations which assume a smooth contact obeying Amontons-Coulomb's friction law. For the normal indentation a Finite Elements method was used, whereas for the sliding regime a semi-analytical model was developed. These direct comparisons showed that our device was accurate enough to discriminate between dry and lubricated contact conditions and evidenced load-dependent deviations from Amontons-Coulomb's profiles. These deviations are qualitatively interpreted by taking into account the finite compliance of the contacting micro-asperities population. [1] J. Scheibert *et al.*, arXiv:0711.1117v1

Julien Scheibert
LPS-ENS, CNRS-UMR 8550 Paris, France

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