



Measuring the contact area by SPM imaging

L Charleux, V Keryvin, Jean-Pierre Guin, M. Nivard, Jean-Christophe Sangleboeuf, Y Yokoyama

► To cite this version:

L Charleux, V Keryvin, Jean-Pierre Guin, M. Nivard, Jean-Christophe Sangleboeuf, et al.. Measuring the contact area by SPM imaging. Fifth International Indentation Workshop, The University of Texas at Dallas, Nov 2015, Dallas, United States. hal-01422894

HAL Id: hal-01422894

<https://hal.science/hal-01422894>

Submitted on 27 Dec 2016

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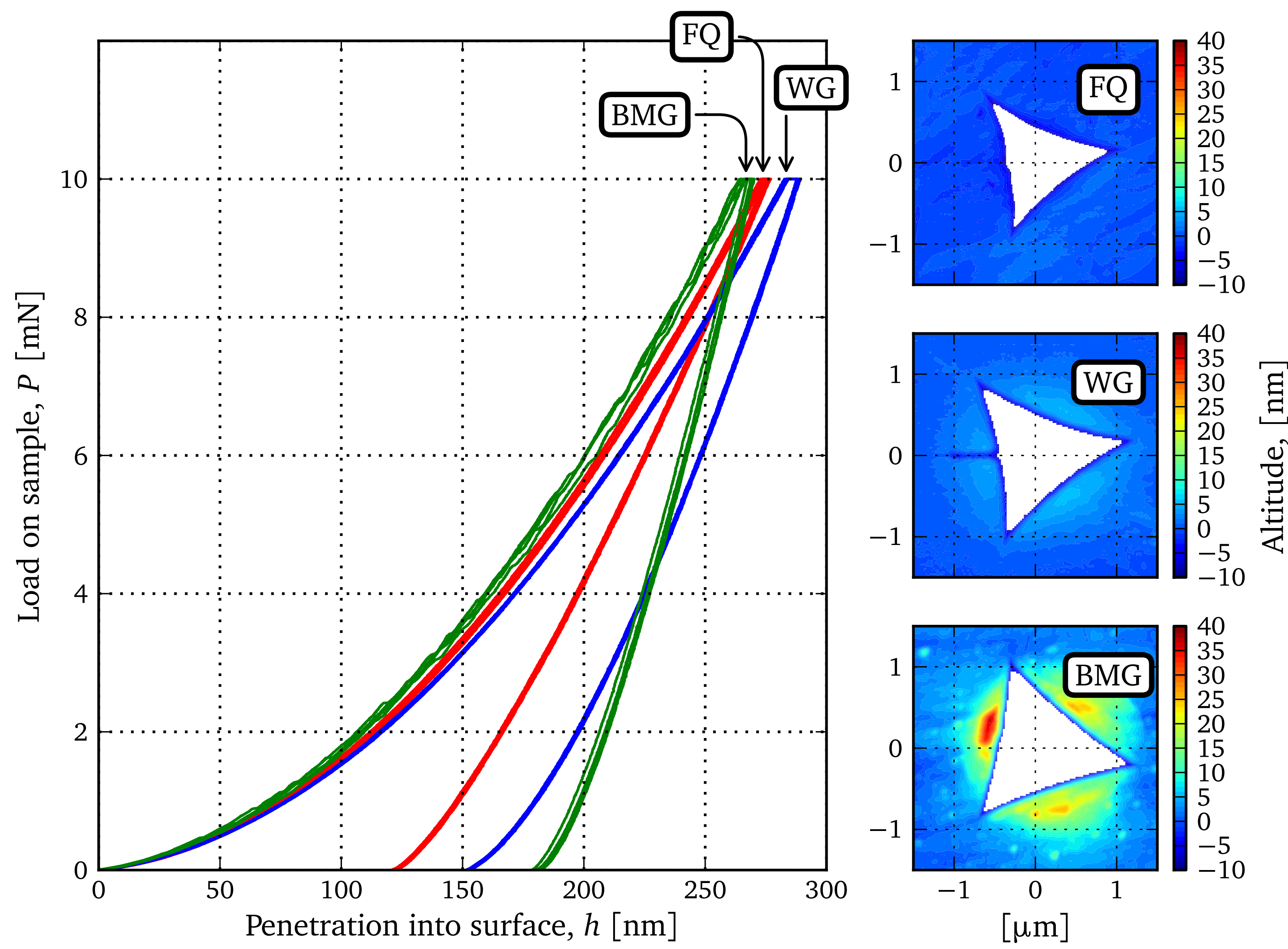
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Measuring the contact area by SPM imaging

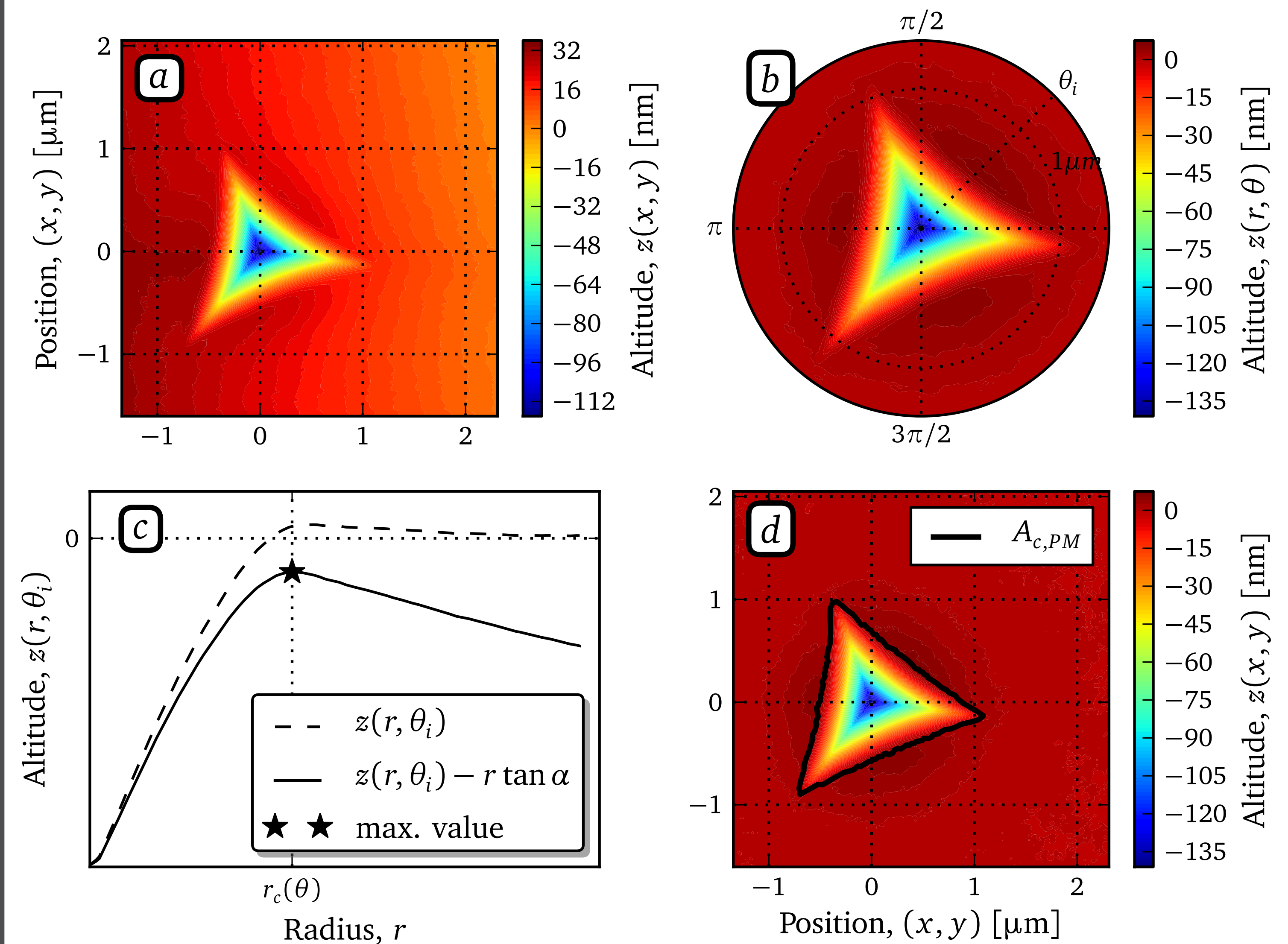
L. Charleux, V. Keryvin, J.-P. Guin, M. Nivard, J.-C. Sangleboeuf, Y. Yokoyama

Univ. Savoie Mont Blanc (France), Univ. Bretagne Sud (France), Univ. Rennes 1 (France), Tohoku Univ. Sendai (Japan)

Indentation + SPM imaging

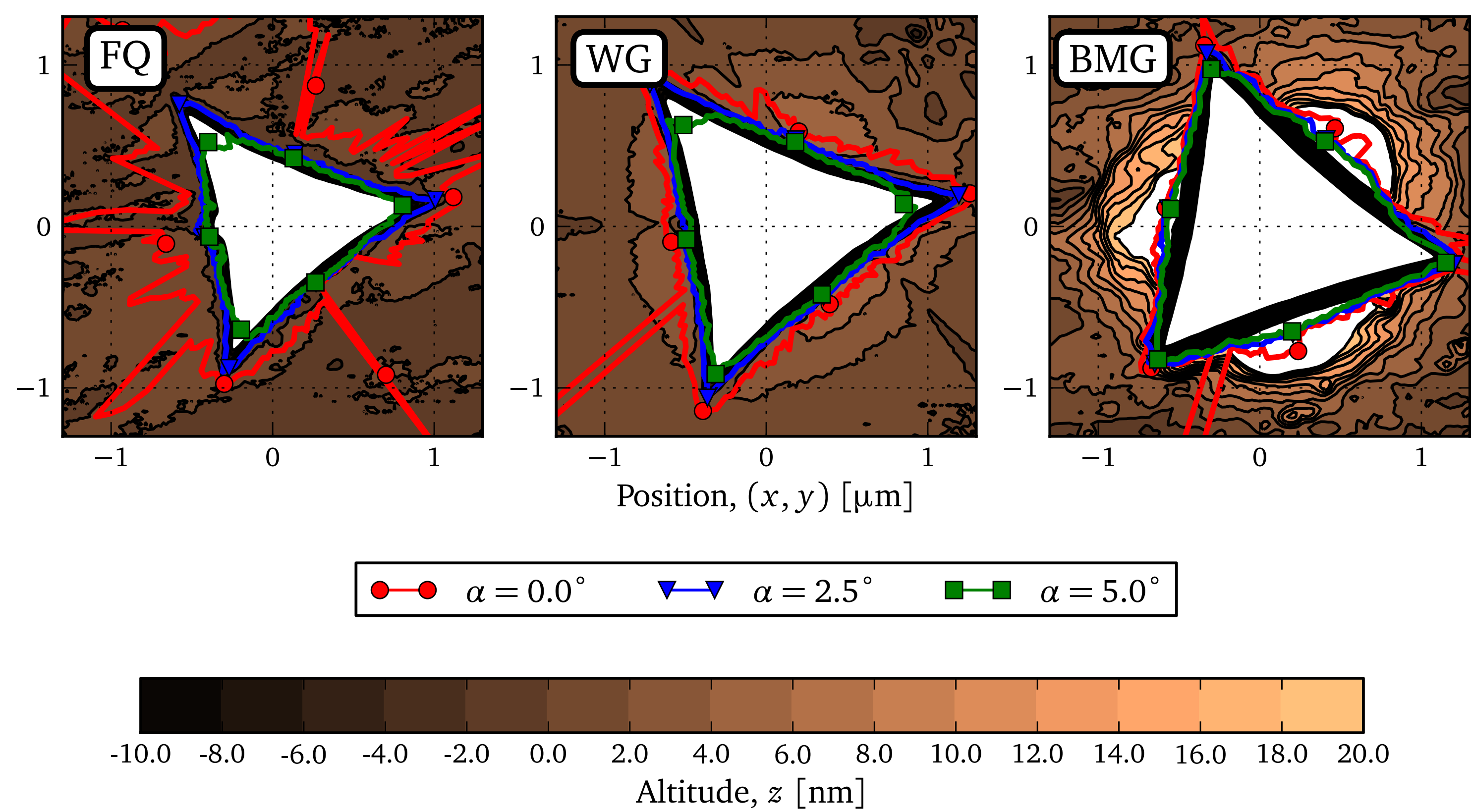


Measuring the contact area A_c



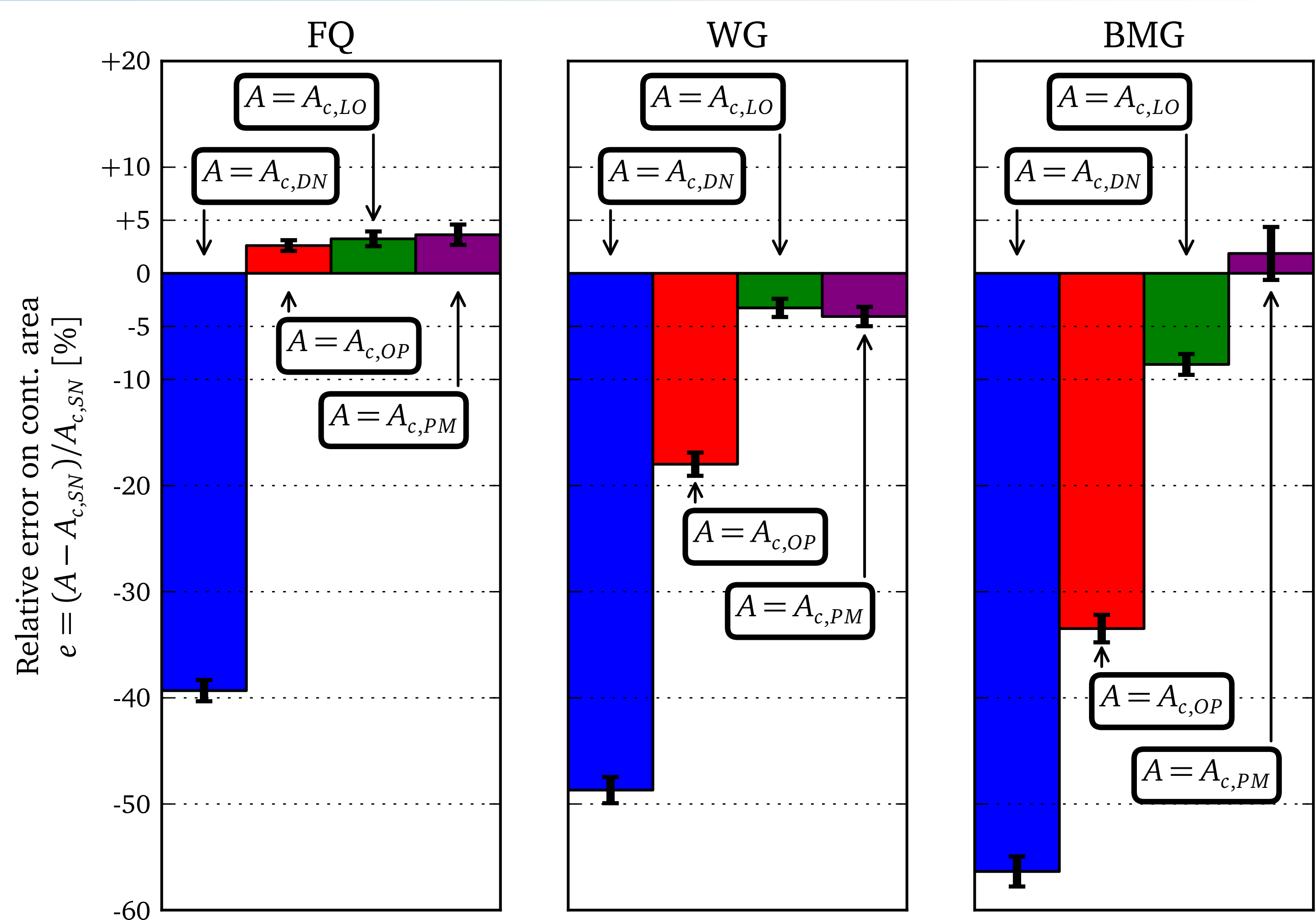
Each cross section is tilted by α

The role of α



Best choice: $\alpha = 2.5^\circ$

Experimental benchmark

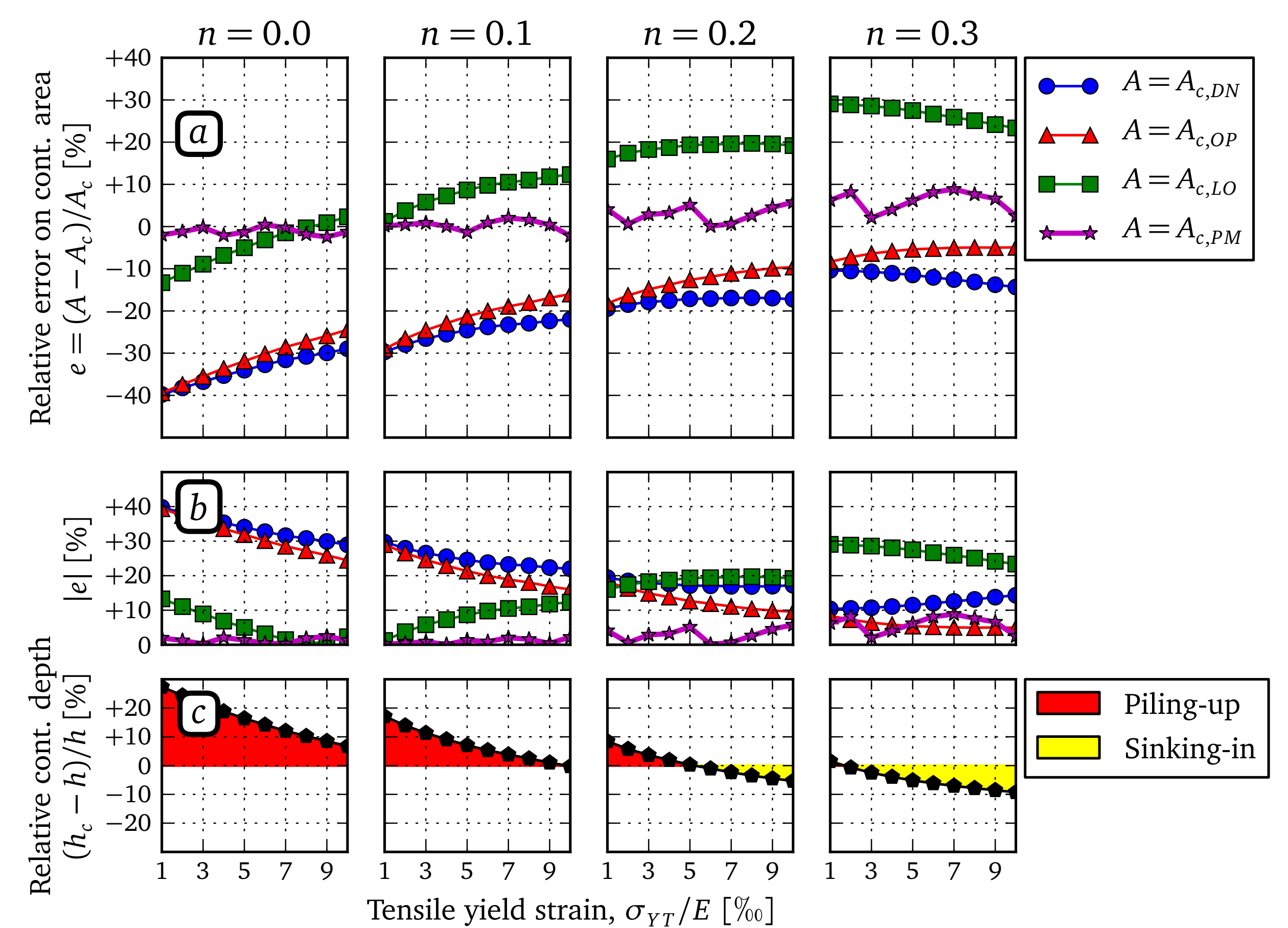


References

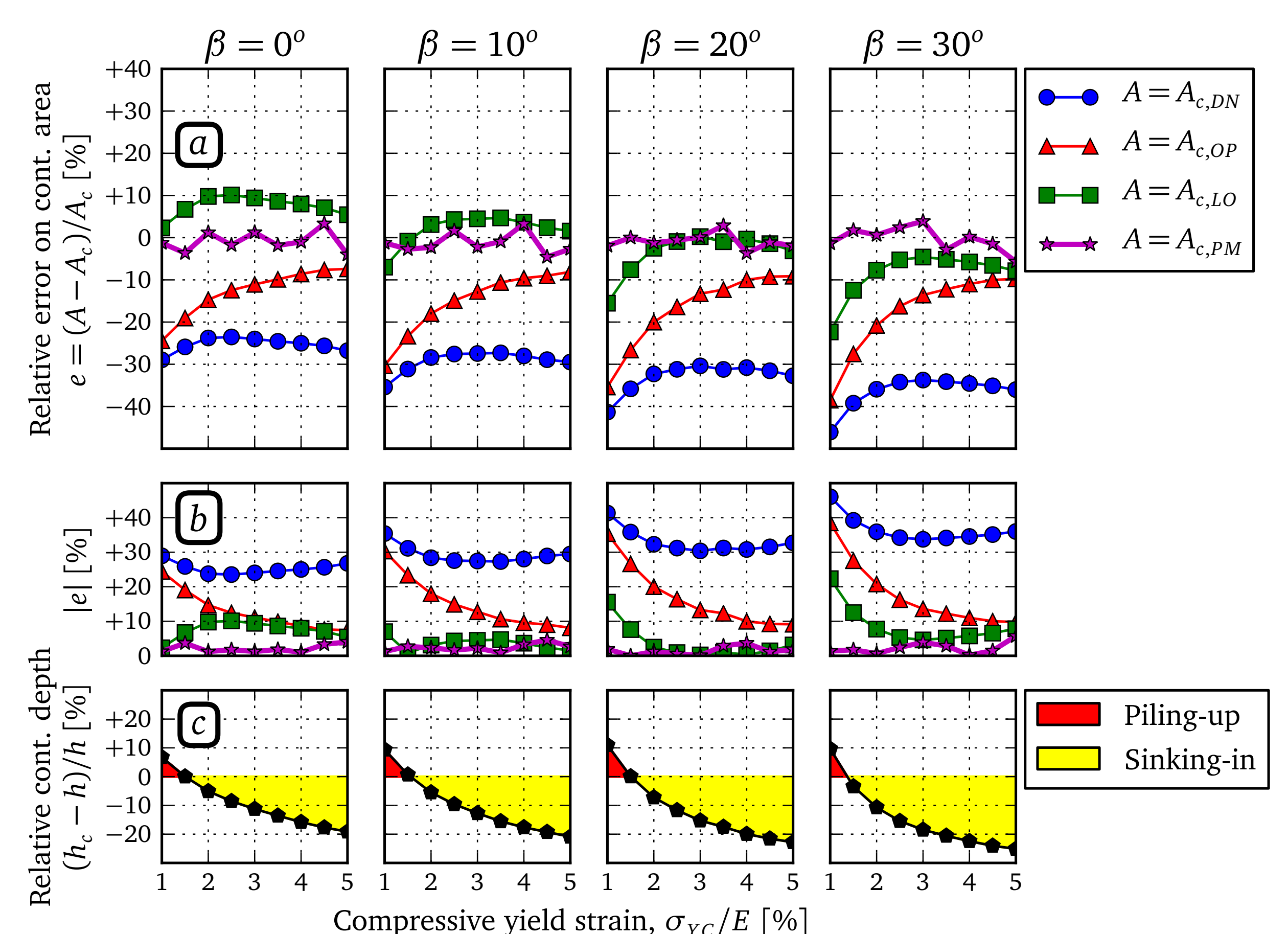
- <https://github.com/lcharleux/spym>
- L. Charleux, V. Keryvin, M. Nivard, J.-P. Guin, J.-C. Sangleboeuf, and Y. Yokoyama, "A method for measuring the contact area in instrumented indentation testing by tip scanning probe microscopy imaging" Acta Mater., vol. 70, pp. 249–258, 2014.

Numerical benchmark

Hollomon: metallic alloys, power law hardening



Drucker Prager: metallic glasses, pressure sensitivity



- DN : M. F. Doerner and W. D. Nix, "A method for interpreting the data from depth-sensing indentation instruments" J. Mater. Res., vol. 1, no. 04, pp. 601–609, 1986.
- OP : W. C. Oliver and G. M. Pharr, "An improved technique for determining hardness and elastic modulus using load and displacement sensing indentation," J. Mater. Res., vol. 7, no. 6, pp. 1564–1583, 1992.
- LO : [J. L. Loubet, J. M. Georges, O. Marchesini, and G. Meille, "Vickers Indentation Curves of Magnesium Oxide (MgO)," J. Tribol., vol. 106, no. 1, p. 43, 1984.