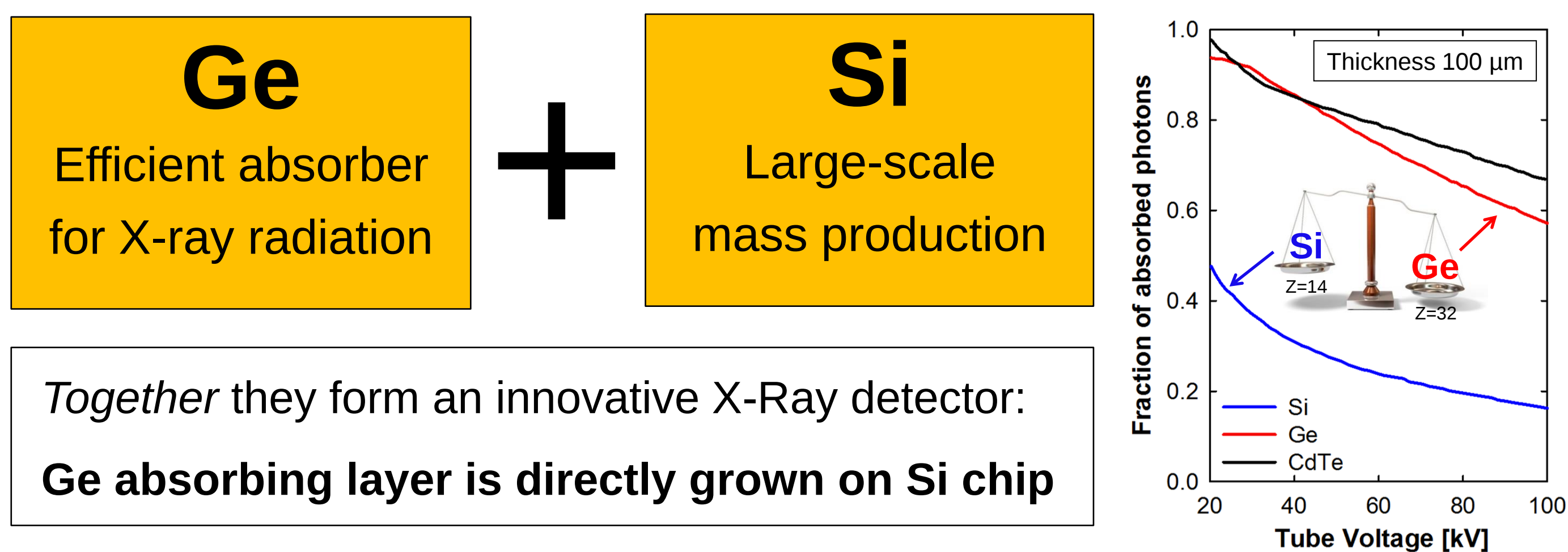


Towards Ge X-Ray detector monolithically integrated on Si CMOS chip

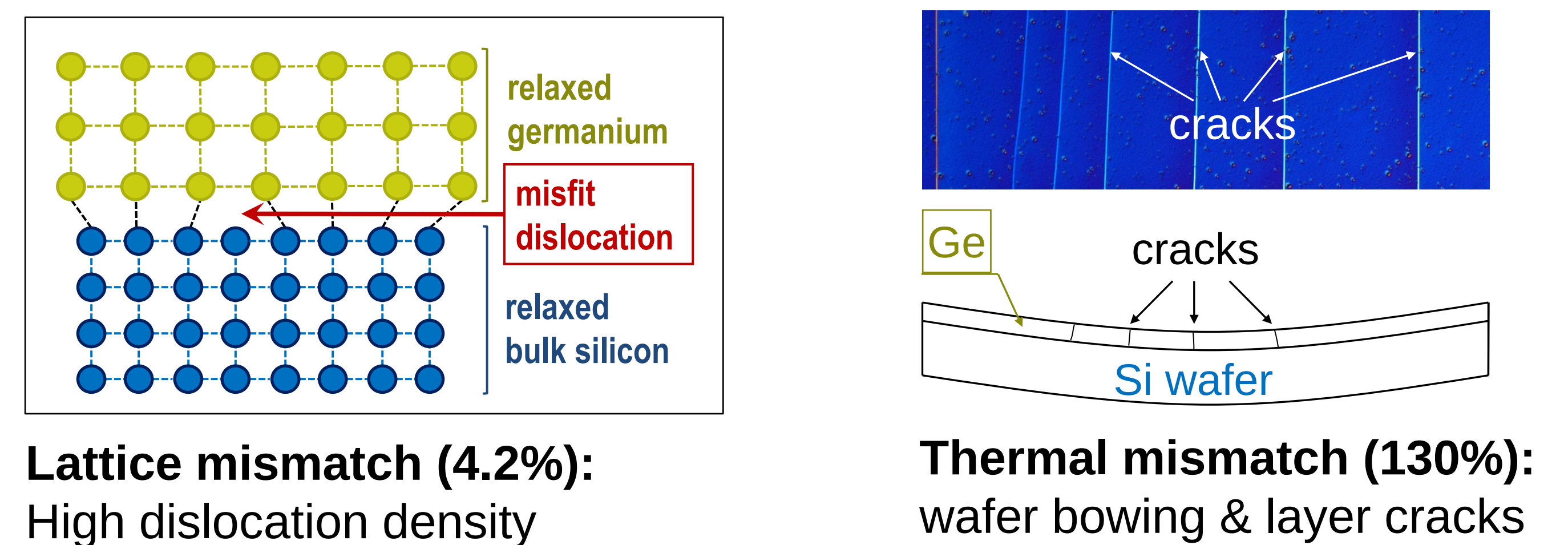
T. Kreiliger^B, A.G. Taboada^B, C.V. Falub^B, T. Bandi^A, A. Dommann^A, R. Kaufmann^A, S. Mouaziz, A. Neels^A, P. Niedermann^A, A. Pezous^A, Y. Zha^A, F. Isa^C, S. Cecchi^C, J. Frigerio^C, D. Chrastina^C, G. Isella^C, L. Miglio^C, B. Batlogg^B, H. von Känel^B



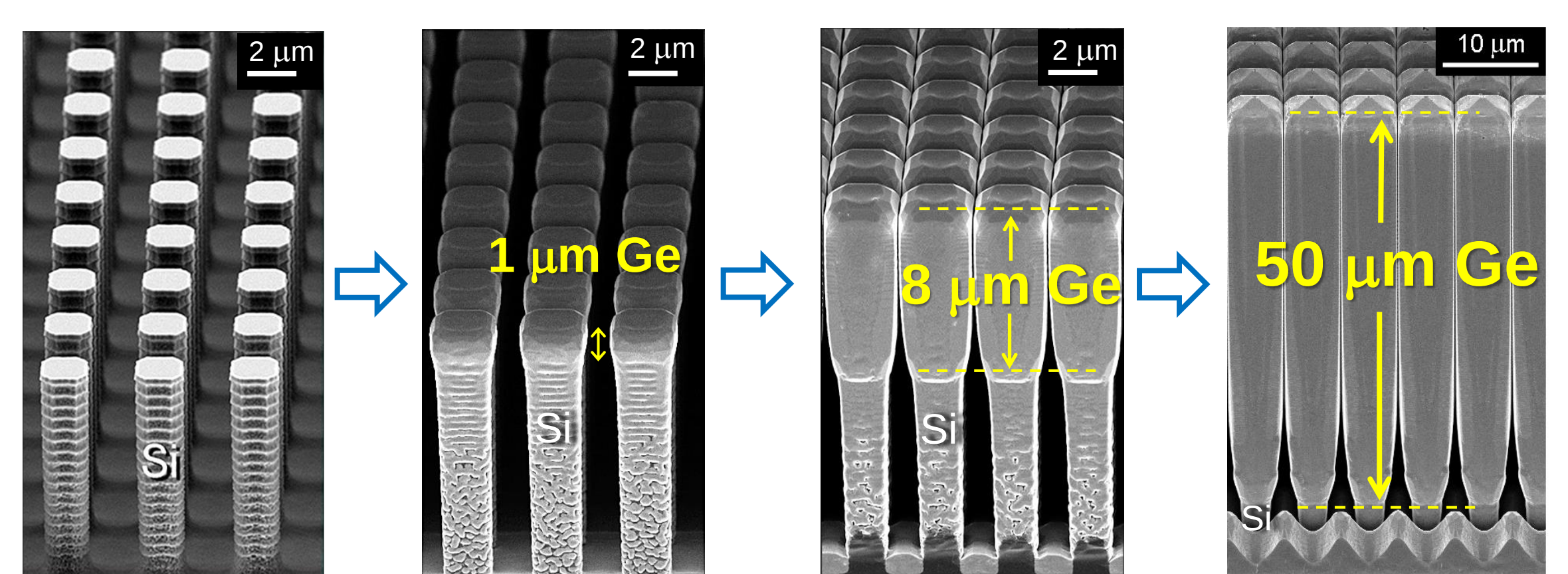
Combine advantages of 2 materials



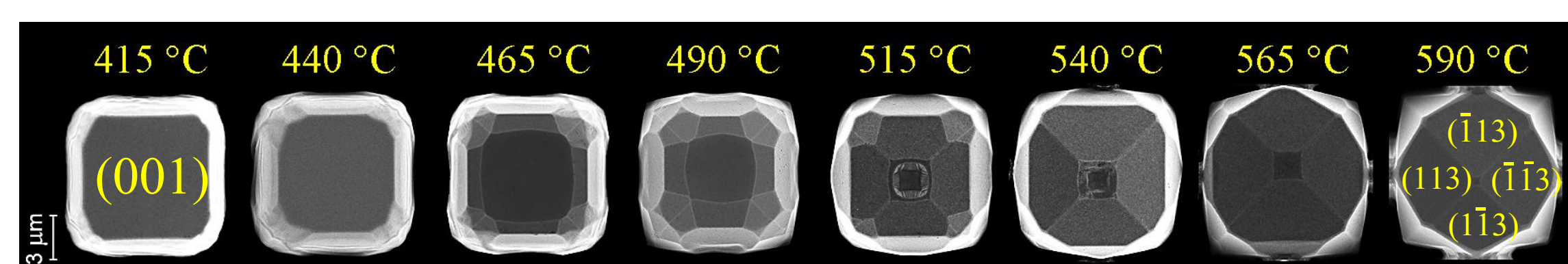
Challenges of planar Ge on Si growth



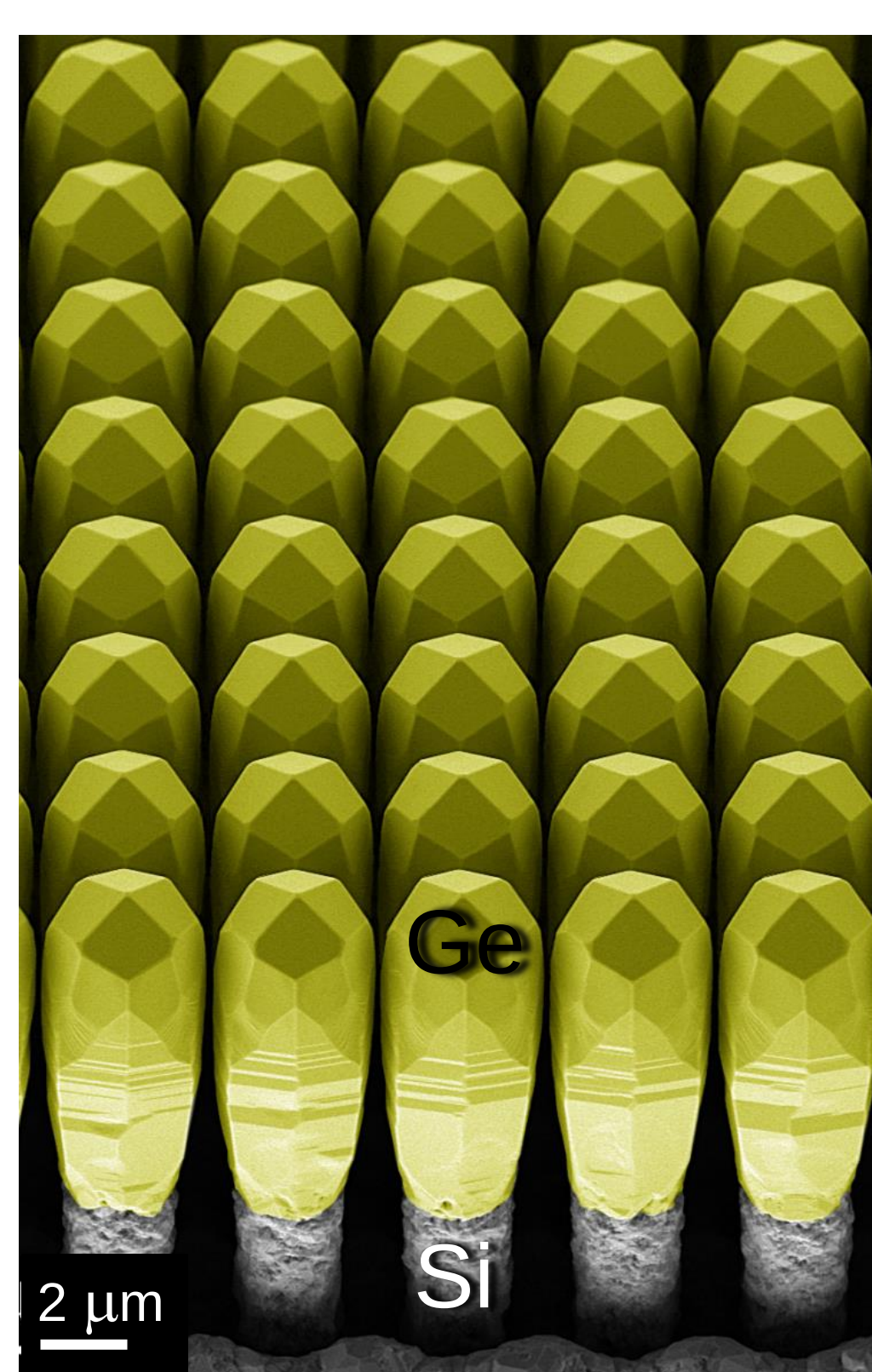
Solution: Grow space filling arrays of 3D Ge crystals



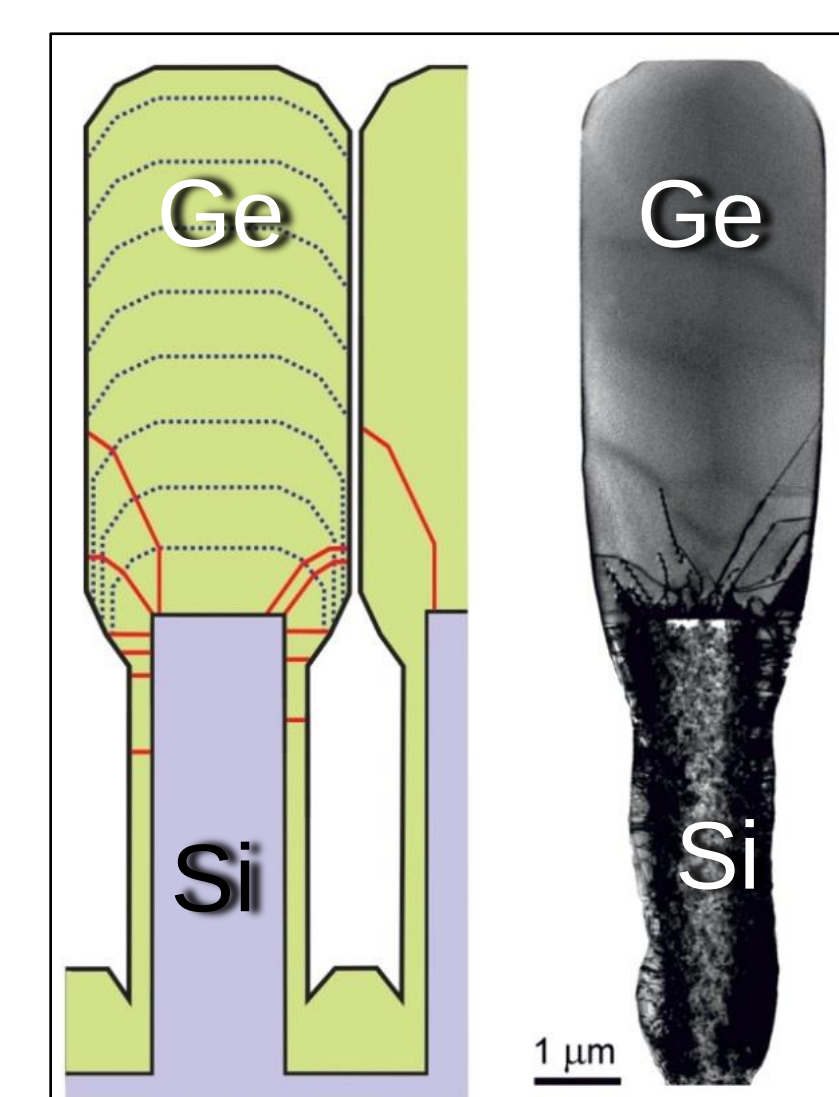
Self limiting lateral growth by "low-energy PECVD": No fusion!
High growth rate (4 nm/s) at low temperature (< 600°C)



Top facet distribution is tunable with temperature

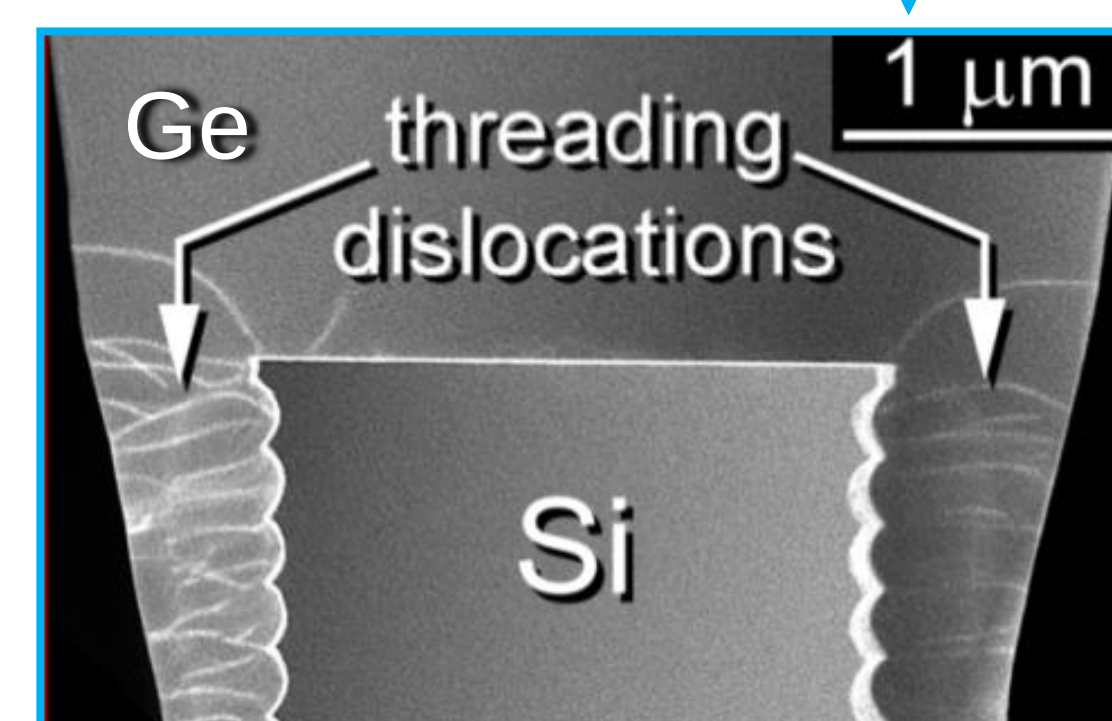
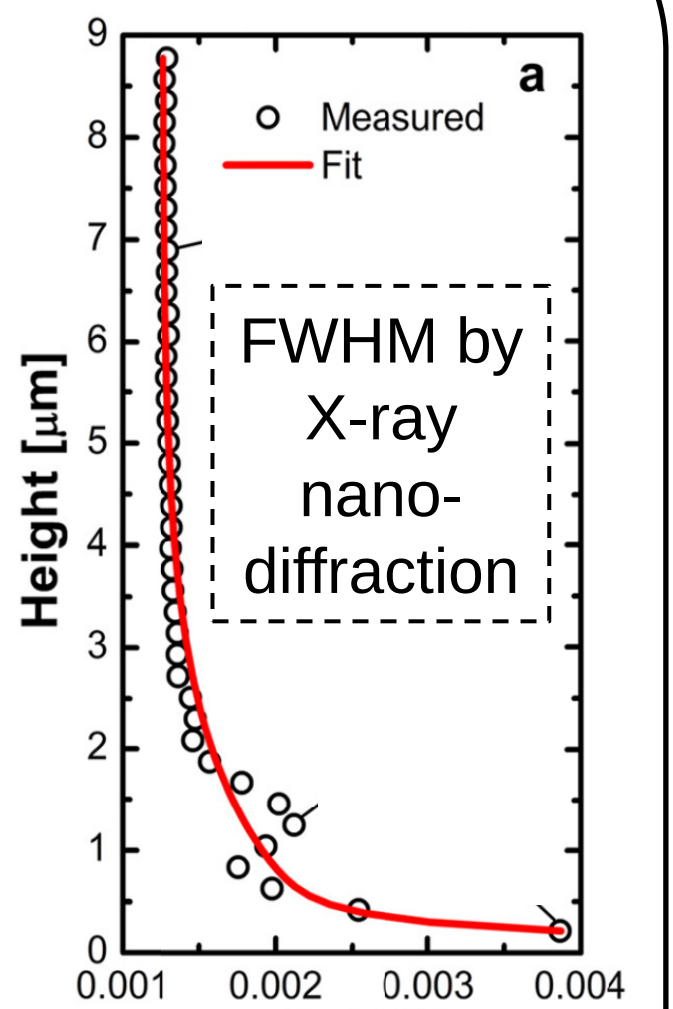


Upper part of Ge is
dislocation- & strain-free

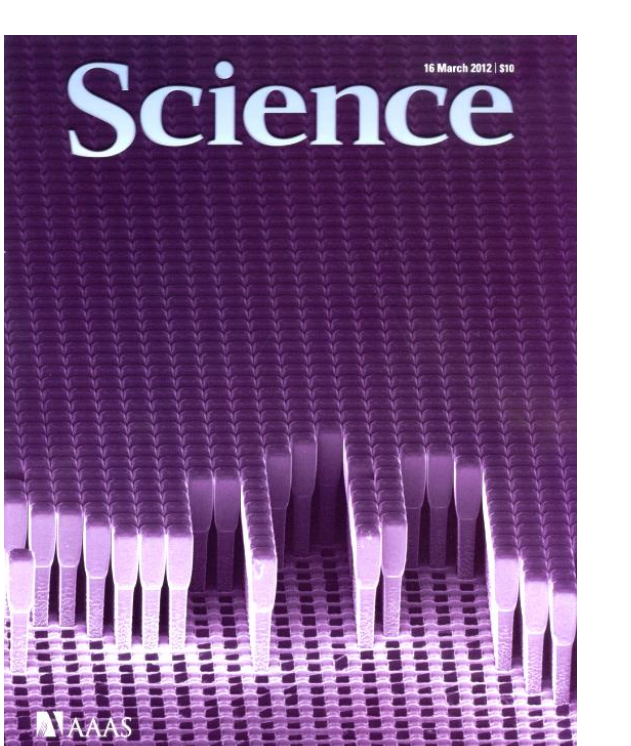


Ge crystal quality
improves after
a few microns
towards top part

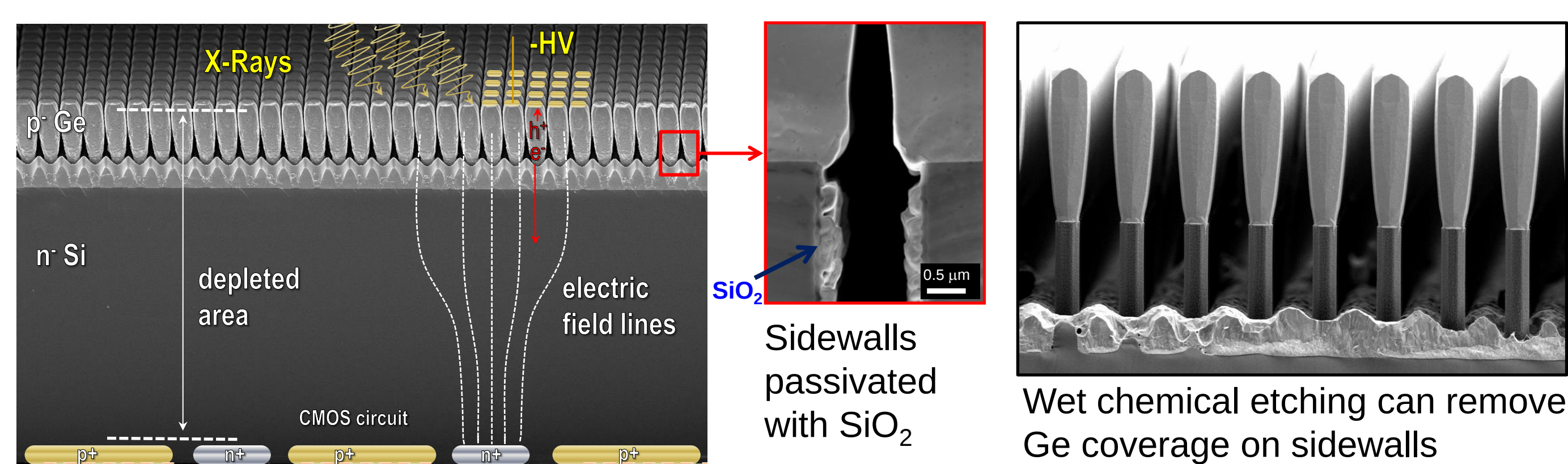
Aspect ratio
trapping of
dislocations



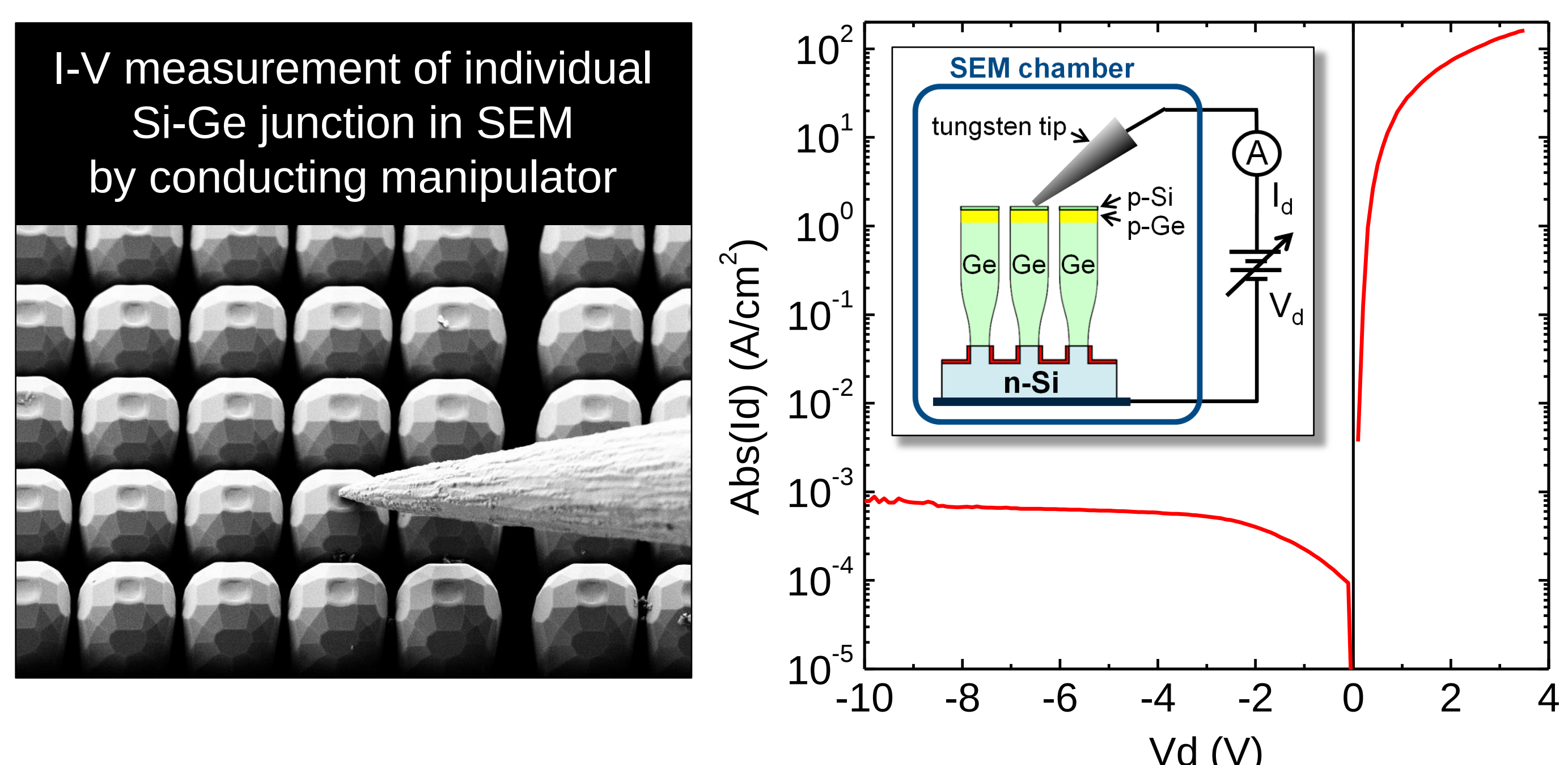
Cover story
3/16/2012



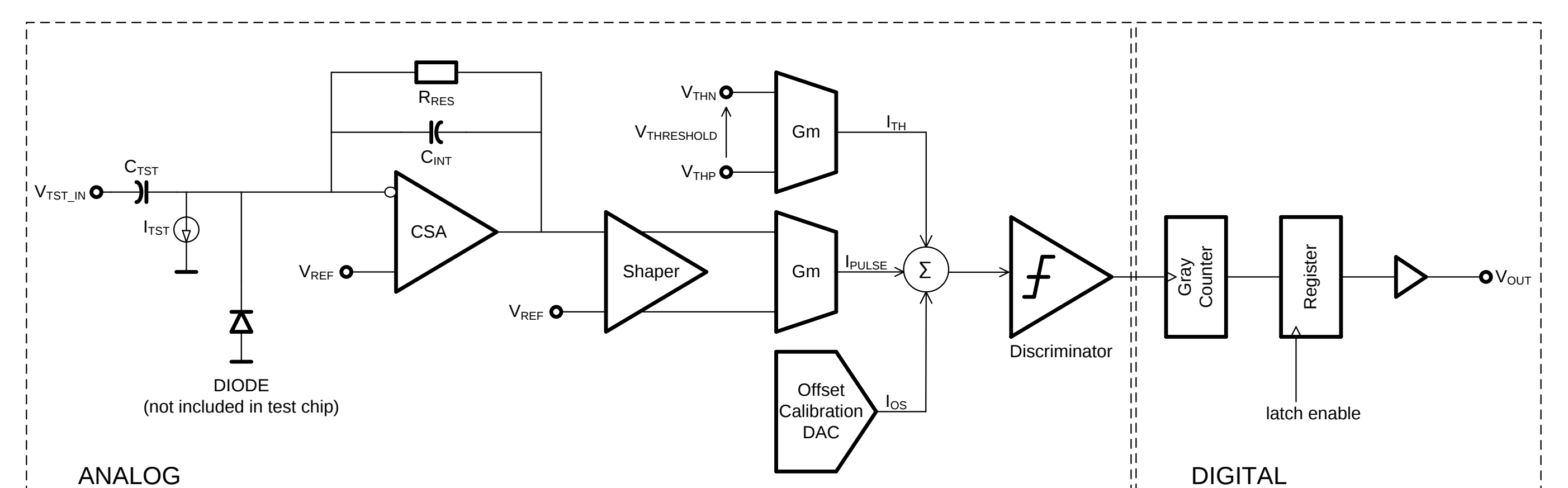
I-V measurements on single Ge towers



Reverse dark current below 1 mA/cm² despite large surface/volume ratio



CMOS pulse-detector circuit



Pixel block diagram

