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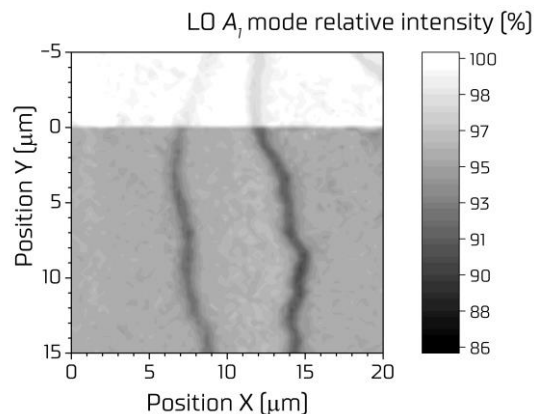
## Determining the number of graphene layers based on Raman response of the SiC substrate

In this presentation we demonstrate a method for direct determination of the number of layers of hydrogen-intercalated quasi-free-standing epitaxial Chemical Vapor Deposition graphene on semiinsulating vanadium-compensated on-axis 6H-SiC(0001). The method anticipates that the intensity of the substrate's Raman-active longitudinal optical  $A_1$  mode at  $964\text{ cm}^{-1}$  is attenuated by 2.3% each time the light passes through a single graphene layer. Normalized to its value in a graphene-free region, the  $A_1$  mode relative intensity provides a greatly enhanced topographic image of graphene and points out to the number of its layers within the terraces and step edges, making the technique a reliable diagnostic tool for applied research. Raman spectra of graphene and the underlying SiC substrate were obtained in a backscattering geometry of the Renishaw inVia confocal microscope using the 532-nm (2.33 eV) line of a continuous-wave Nd:YAG laser and the Andor Newton CCD detector. The laser power was kept at 13.5 mW and the spot size was reduced to  $0.3\text{ }\mu\text{m}$ . For possibly highest imaging resolution the lateral steps in both  $X$  and  $Y$  directions were set at  $0.3\text{ }\mu\text{m}$ . In order to extract graphene spectra and the substrate response three types of 4624-point  $20\text{ }\mu\text{m} \times 20\text{ }\mu\text{m}$  maps were recorded. The authors believe that the protocol brings a reliable diagnostic tool for the quantification and comparison of graphene on SiC properties, thus accelerating research and development activities in the field of graphene-based applications.

### References

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### Figures



**Figure 1:** High-resolution Raman map of the 6H-SiC longitudinal optical (LO) mode relative intensity at  $964\text{ cm}^{-1}$ .