

## Modern Tendency of the SPM Technique Developments

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General line in SPM business development is in the specialization of scanning probe technique for the main applications. That are: SPM line for biology, SPM line for polymers, SPM line for semiconductor research, SPM line for semiconductor industry, SPM line for nanotechnology and combination between SPM lines and over device device (TEM, SEM, optical and infrared spectrometers,...). Inside of each of these applications there are some subapplications for the special conditions (temperature range, atmosphere environments), sample size, required resolution and scan size, special requirements during the measurements (voltage and current, magnetic fields, gradients), types of the most informative measurements, required supplements (light sources and sensors, analyzing systems, additional sensors, ionic or electron guns,...). The resume from this: the number of final configurations have tend to infinity. It is possible to satisfy that requirements only if the systems will be open as for additional irons and electronics and SW.

General lines in the SPM development are in two concepts: “true imaging” and “smart scan”. Real SPM images are not geometrical topography, hardness of samples or friction forces, magnetic or electric field distributions, capacitance and so on. SPM images are some contrasts that due to the distributions of these parameters or there superposition and properties of tested sensor – cantilever, STM tip, optical fiber. The development of the algorithms to make real distributions of real physicals values instead of the parameters that we have now is the general problem of today SPM software. To make more powerful devices it is interesting to induce spectral possibilities into the instruments. Special instrument for it is now in our R&D and named NANOFINDER (see [www.ntmdt.ru/products](http://www.ntmdt.ru/products)).

The progress in digital signal processor gives us the possibility the realization of the smart scan concept - that are in the special scan options with using knowledge that were done during the scanning in real time procedure: information for the previous line topography, automatically determinations of drift parameter, inducing the positions sensors inside scanners. That modifications transformed SPMs from the instrument for qualities analysis to the metrological devices.

Third problem of SPM technique is the creations of the special micromechanic sensors to measure the different properties including nanotubes for the high resolutions, p-n junctions, driving magnetic for the MFM, multi probe technique, special manipulators for assembled problems decision.