Calculated column optical properties using finite element software (program: ELD by B. Lencova).

Conditions:
- Beam energy (E): 30 kV
- Source size (δ): 50 nm
- Energy spread (ΔE): 5 eV
- Opening angle (α): 0.15 mrad
- Working distance: 2 mm

Ref. Nano-FIB Dvt
- Source magnification: 6.33 nm 4.95 nm 2.98 nm
- Aberrations: 1.76 nm 2.45 nm 2.92 nm
- Total Ion Probe: 6.57 nm 5.53 nm 4.27 nm

Enhanced Ion emission stability
- Detector current (dI/dV) > 50 µA/kV
- Emission current (µA)
- Extractor voltage (kV)

Extended patterning capabilities
- Very high positioning accuracy (13 nm) with 2 nm steps
- Field Stitching (Max. wafer diameter 350 mm)
- Multi level and unattended batch processes characterization
- 10 MHz 16 bits pattern generator
- GDSII file format

Abstract: Controlled and reproducible fabrication of nano-structured materials will constitute one of the main industrial challenges for the next ten years. Because of the severe limitations of existing nano-fabrication techniques, we are developing an innovative Focused Ion Beam instrument (FIB) with improved capabilities in terms of nano-patterning. In this work we present preliminary results obtained with this instrument. We exploit the simple, direct, clean and reproducible nano-structuring potential of a "Nano-FIB" system, which is enabling studies of new physical phenomena.

High resolution & selectivity Ion optics

Enhanced application spectra

envisaged application spectra

Emerging challenges
- Nanobiotechnology
- DNA analysis
- Nanostructures
- Nano-patterning
- Nano-deposition
- Bio-sensing
- Bio-chips

Envisioned application spectra

"Bottom-up" compatibility

Nano-FIB test results
- a) SEM image of FIB etched lines on a GaAs sample
- b) High resolution FIB etched line
- c) SEM image circular holes drilled in a 10 nm thick SiO2 on a Silicon substrate

"Top-down" approach

Nano-FIB prototype at LPN