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"Efficient phosphor-free, white light emission from ordered arrays of GaN/InGaN nanocolumnar LEDs grown by Selective Area MBE"

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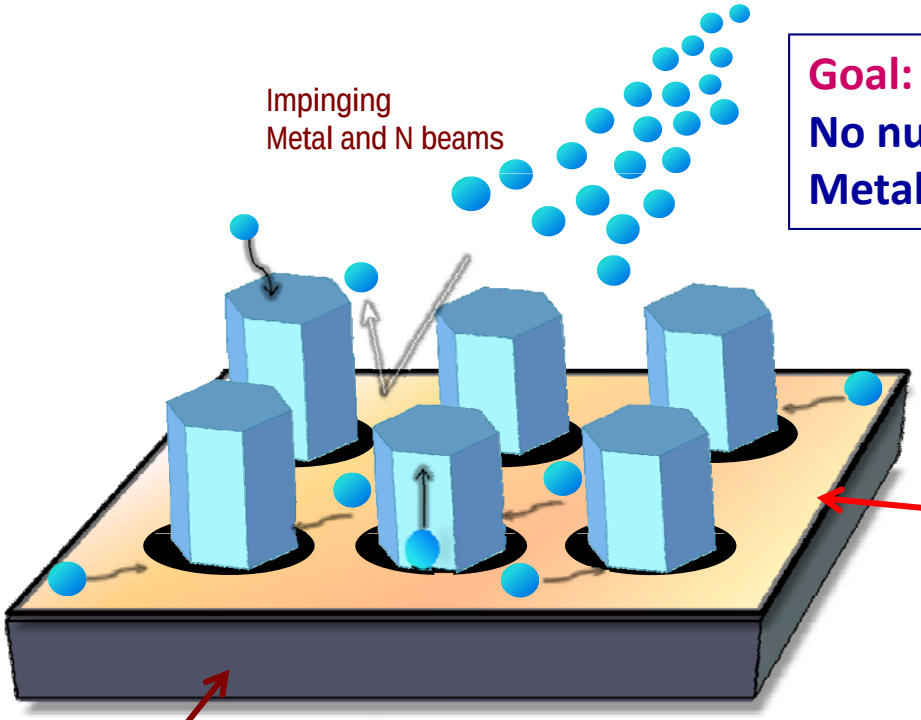
Outline

- Self- assembled III-Nitride Nanorods and Nanostructures
- Ordered growth of GaN/InGaN Nanorods
- Emission from ordered InGaN/GaN Nanorods arrays
- Ordered arrays of NanoLEDs (axial and core-shell)

SELECTIVE AREA GROWTH (SAG)



Goal: SELECTIVITY
No nucleation on the mask
Metal atoms only diffuse to holes or desorb

Nanohole mask (Ti, SiO_2, SiN_x, Mo...)
Mask roughness is critical

Substrates:

Si (111): several NRs per hole (stripe)
E. Calleja et al. phys. stat. sol. (b) 244, 8, 2816 (2007)
K.Kishino et al. Electronics Letters, 44, 13 (2008)
GaN templates: isolated NRs (1 per hole) with diameters > 100 nm
Sekiguchi et al. Appl. Phys. Lett. 96, 231104 (2009)

Ordered GaN NRs on Silicon (buffered)

R1144