

# Exhibit E

Excerpts from

*Technical and Manufacturing Challenges and the Prospect for  
HVM using ArF Pitch Division*, S. Sivakumar

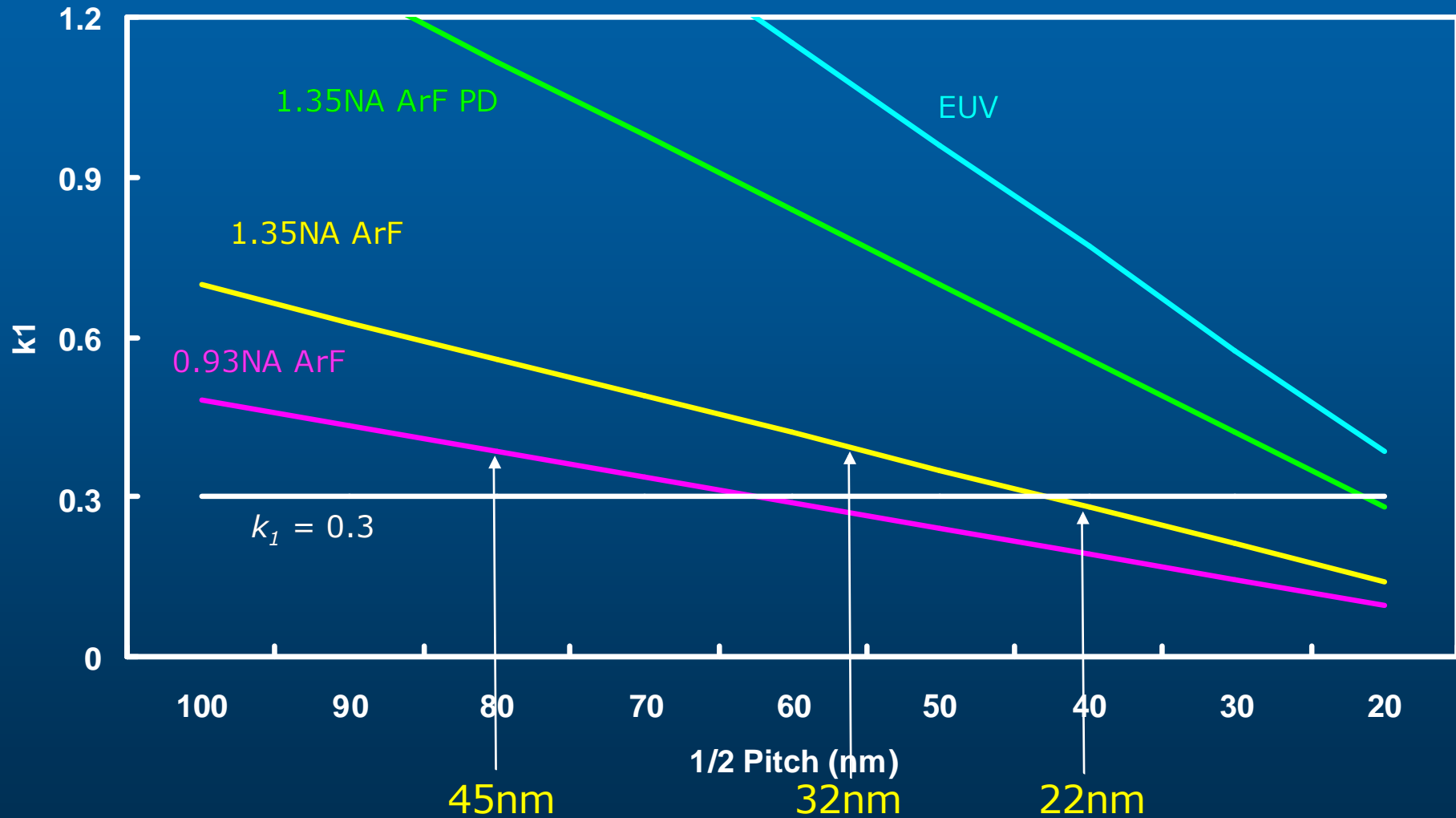


# Technical and Manufacturing Challenges and the Prospect for HVM using ArF Pitch Division

Sam Sivakumar

*Intel Corporation*

# 22nm Process – 2011 HVM

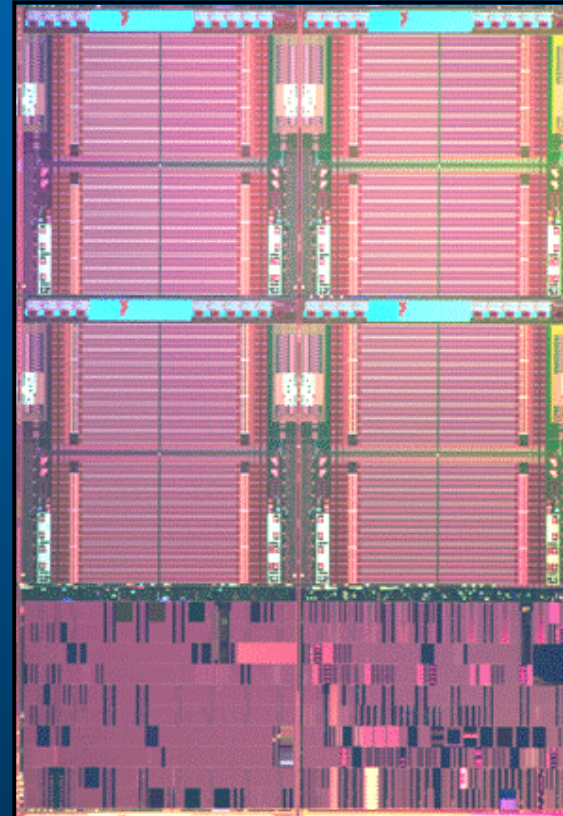


# 22nm SRAM Test Chip

SRAM, Logic, Mixed-Signal  
Test Circuits

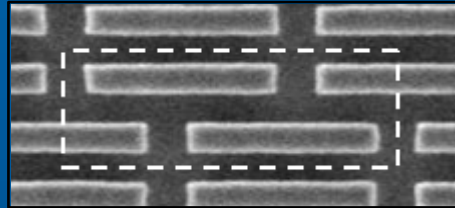
SRAM, Logic, Mixed-Signal  
Test Circuits

Discrete  
Test Structures

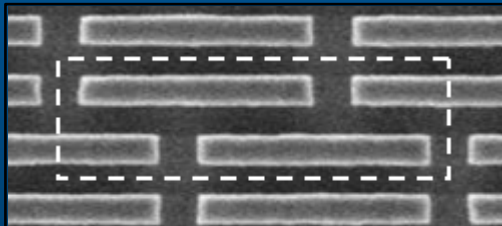


*Intel is first in the industry to  
demonstrate working 22 nm circuits*

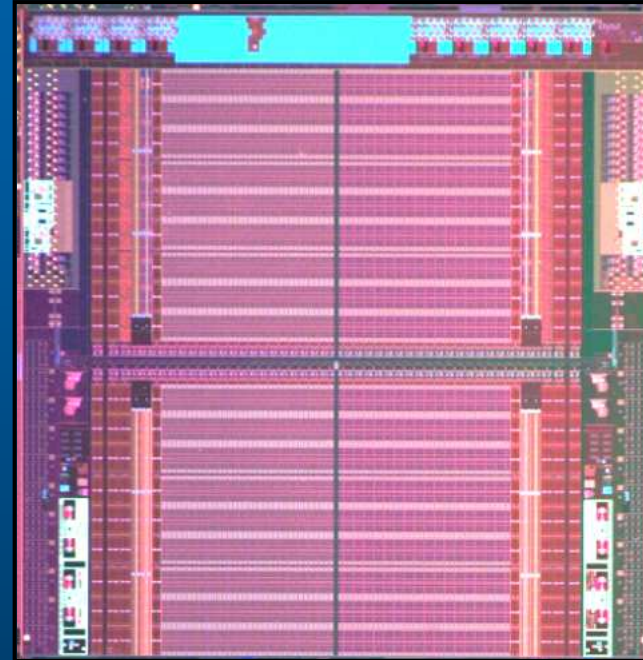
# 22nm SRAM Test Chip



0.092  $\mu\text{m}^2$  SRAM cell  
for high density applications

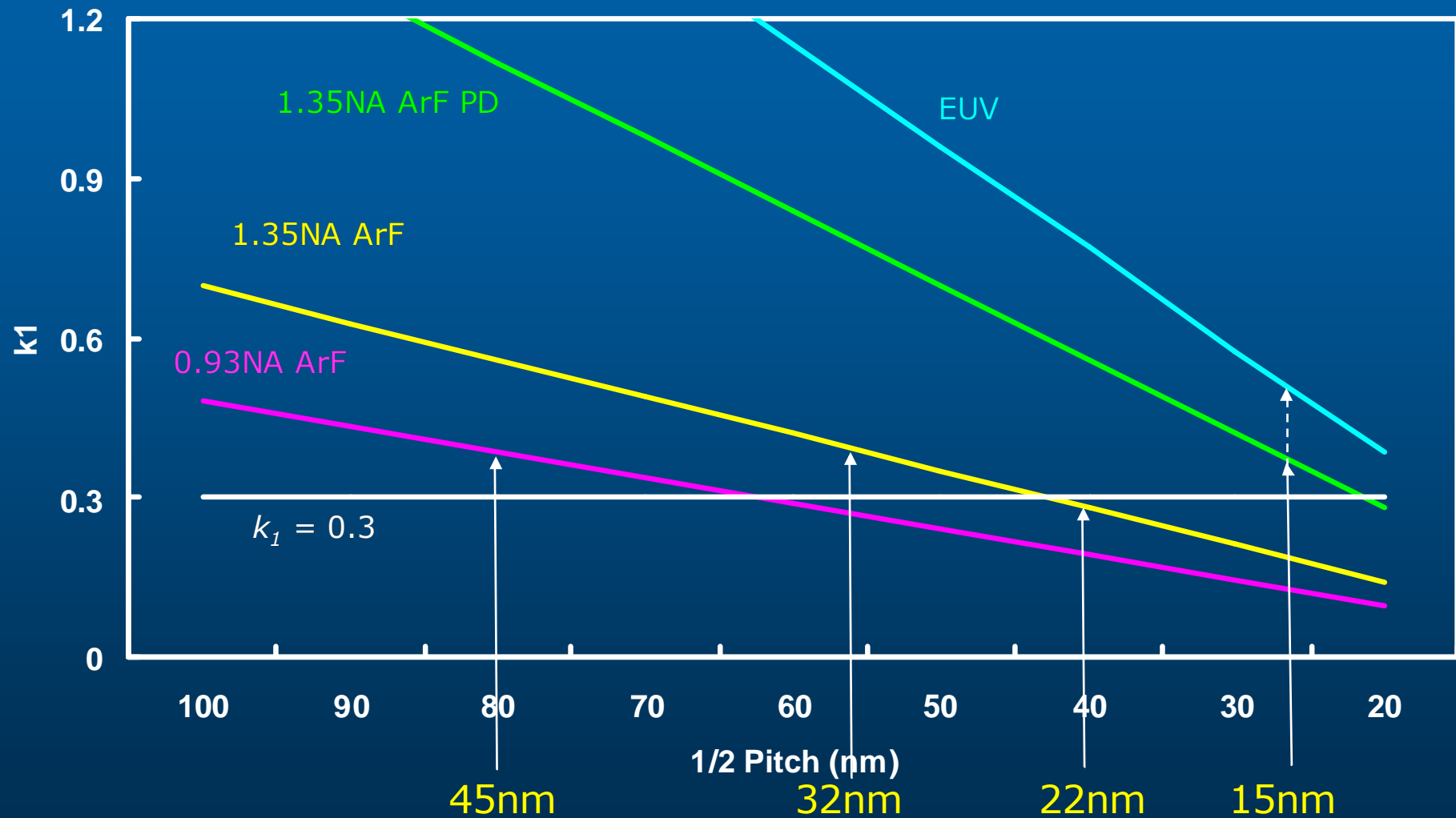


0.108  $\mu\text{m}^2$  SRAM cell  
for low voltage applications



*0.092  $\mu\text{m}^2$  is the smallest SRAM cell  
in working circuits reported to date*

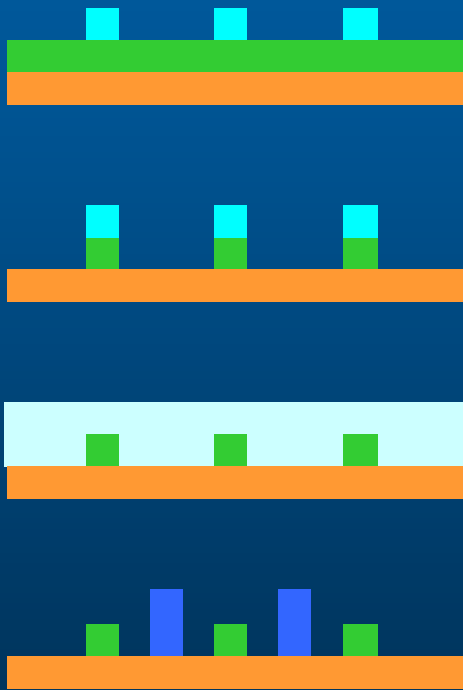
# 15nm Process – 2013 HVM



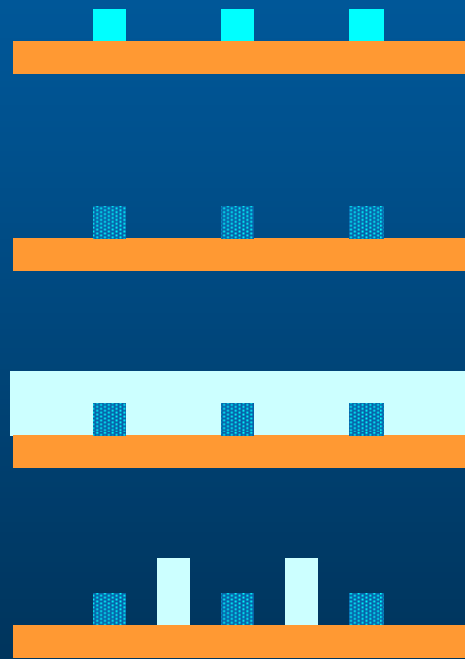
# Pitch Division

## Double Patterning

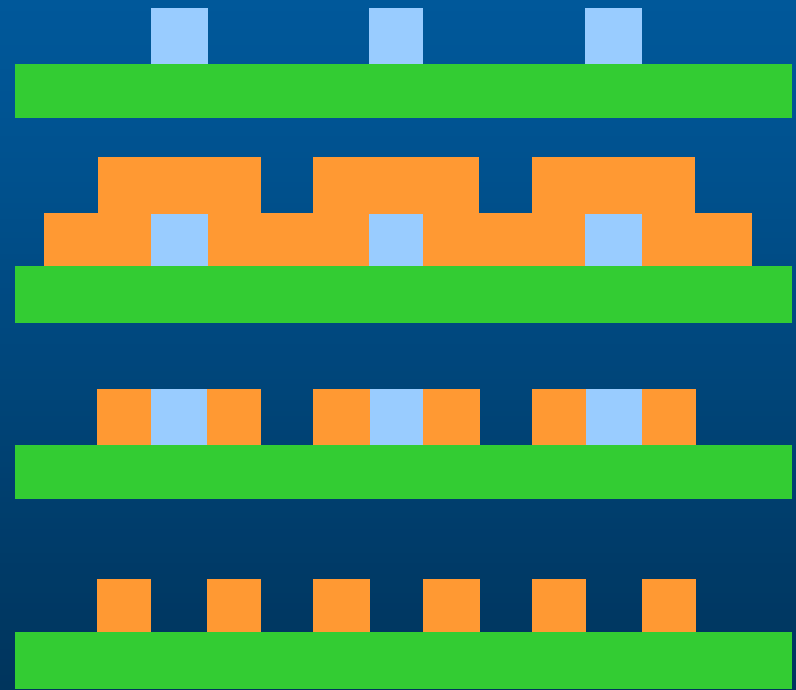
### LELE



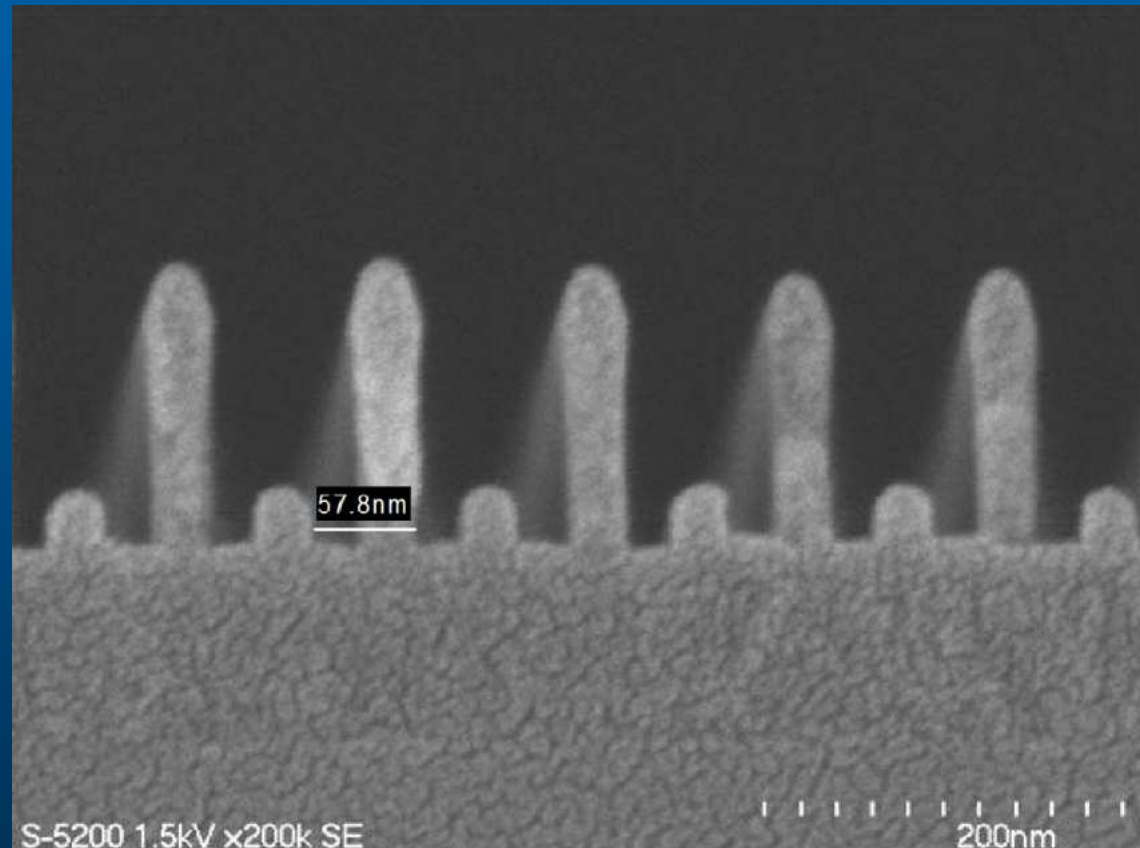
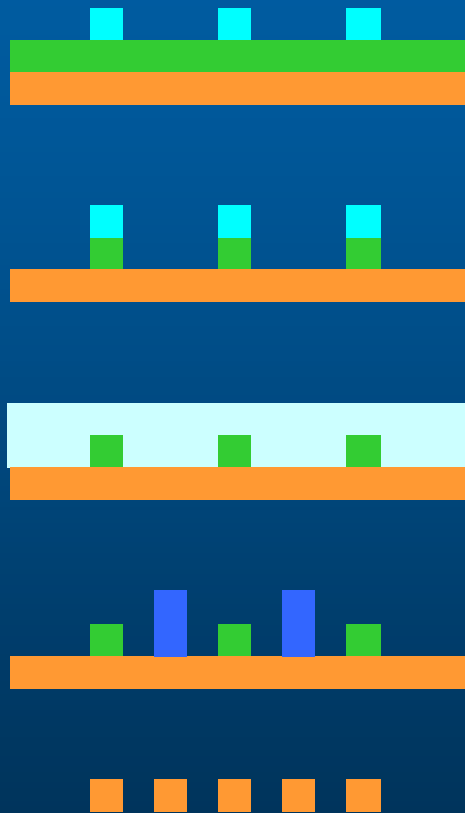
### LFLE



## Spacer

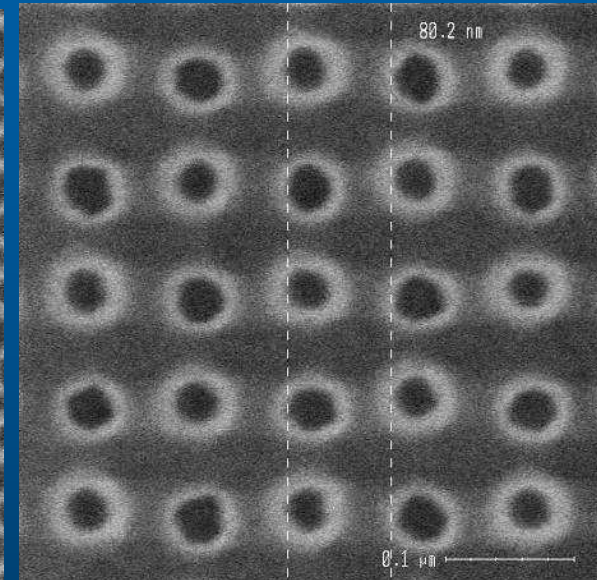
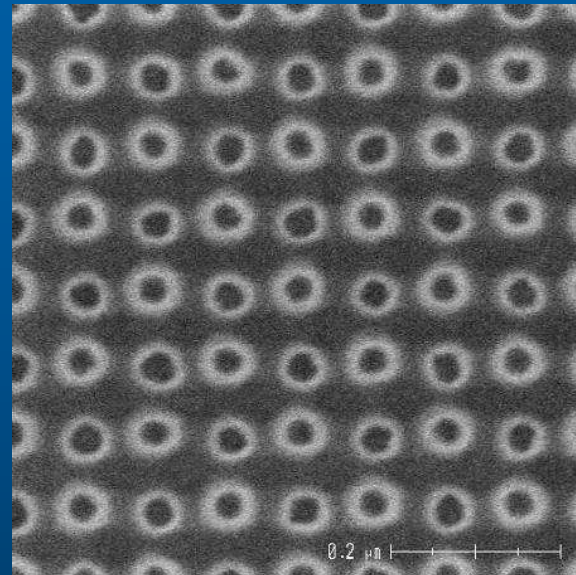
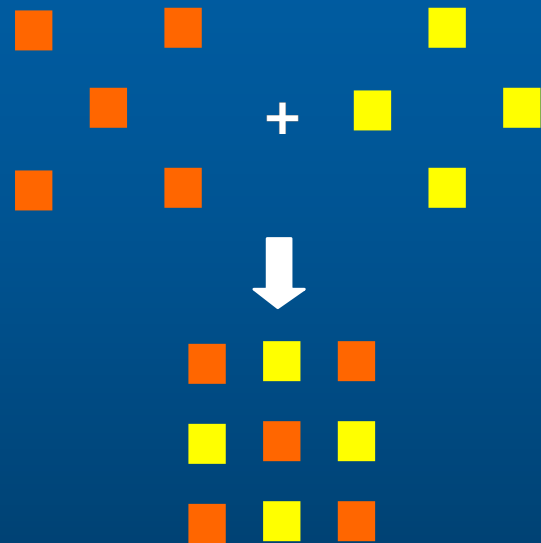


# Double Patterning for L/S - LELE





# Double Patterning for Vias - LELE



*Several different PD options will be picked and used depending on layer-by-layer applicability*