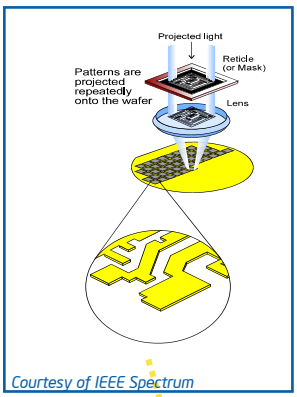
Computational Lithography

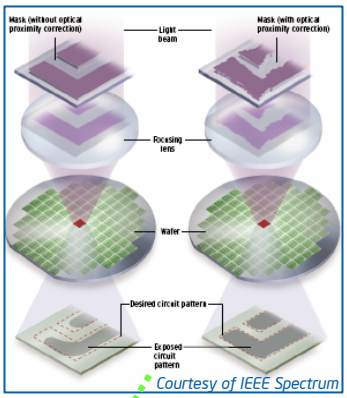
Technology that makes Technology Affordable

Lithography is enabler of Moore's Law

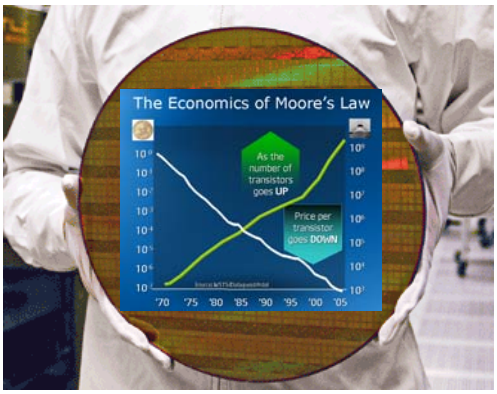
Computational Lithography is enabler of Moore's Law in 21st Century

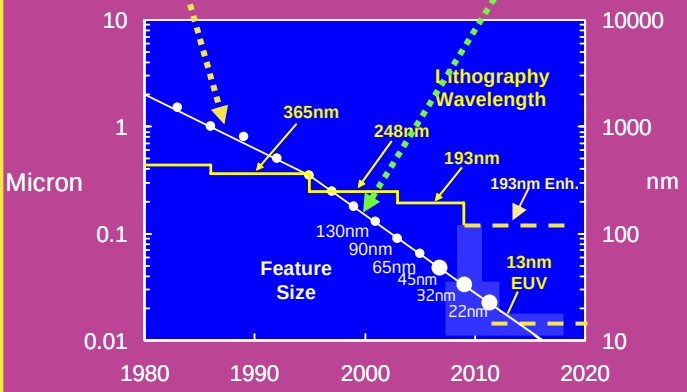


Courtesy of IEEE Spectrum

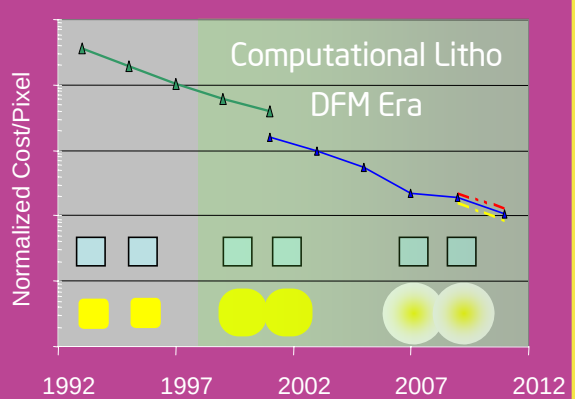


Courtesy of IEEE Spectrum





- When features become smaller than the exposure wavelength our ability to reproduce complex design patterns diminishes.
- Use of computational lithography that models light as it travels through mask, lens and resist allows us to pre-compensate for distortions by changing the features on the mask



- Cost/Pixel is declining despite diminished pattern fidelity and use of more expensive lithography tools through use of DFM and computational lithography

Pixel here defined is as a (node half-pitch)²

DFM needed to use less efficient but cheaper pixels to maintain scaling and yield

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Computational Lithography

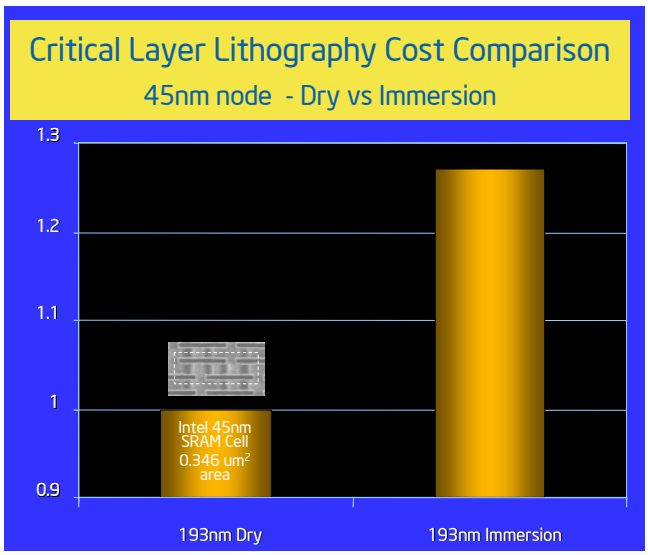
Technology that makes Technology Affordable

Computational Lithography Reduces Lithography cost:

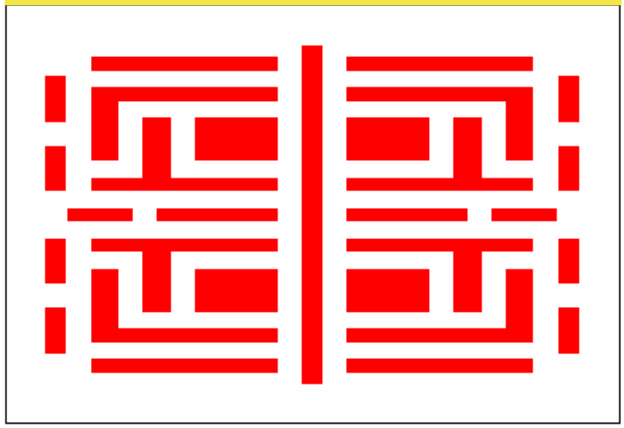
Through the use of less expensive Exposure Tools:

OR

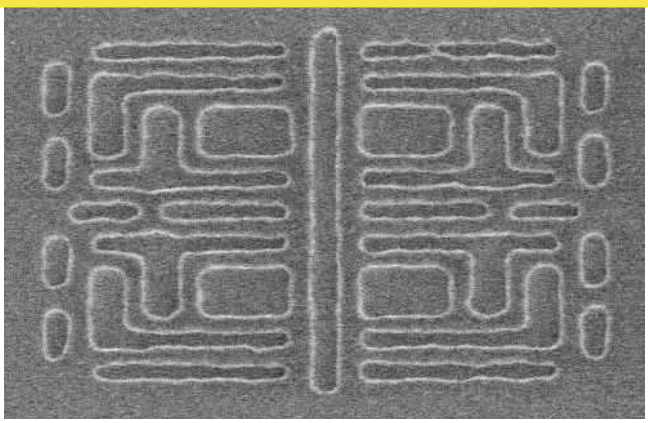
Using existing Exposure Tools beyond their designed capabilities



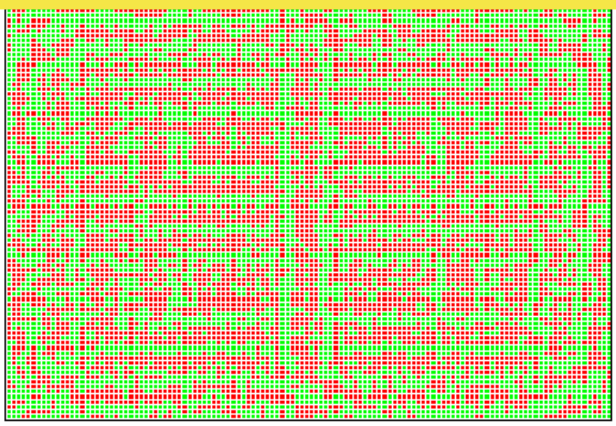
Example "N" nm node design layout



"N" nm Layout printed with "N-1"nm Tool



Pixelated Mask for that layout



Green – Glass; Red - etched pits in glass

Intel's Computational Lithography will be a center of technology innovation and the backbone of Intel's proprietary DFM for the foreseeable future

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