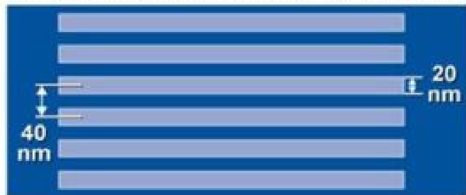
Complementary electron-beam lithography extends optical litho life

By Debra Vogler, senior technical editor

March 9, 2011 -- At SPIE Advanced Lithography (2/27-3/3/11, San Jose, CA), David Lam, chairman of Multibeam Corp., and the founder and former CEO of Lam Research, presented the concept of complementary e-beam lithography (CEBL) -- a technology that is being used to complement and extend optical lithography for advanced logic ICs.

In the podcast interview with Debra Vogler, senior technical editor, Lam discusses the technology in detail, and also cites the inspiration for his paper: a presentation on complementary lithography by Intel Senior Fellow Yan Borodovsky, at last year's SPIE Advanced Lithography Conference. Also significant to CEBL is a presentation by Sam Sivakumar (Intel Fellow and director of lithography) at Nikon's LithoVision event this year (2/27/11), in which he discussed how the layout design style of logic devices is migrating from 2D to 1D.

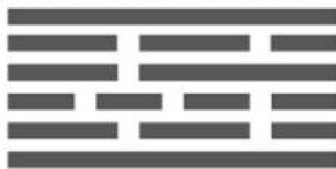
20nm line/space pattern with optical Litho

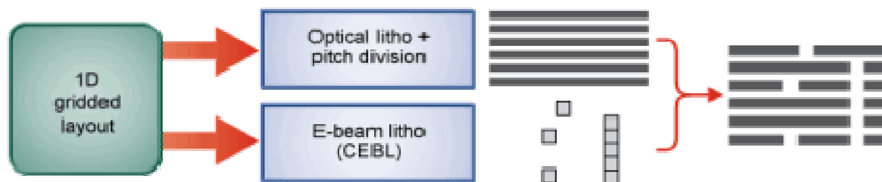


Final pattern requires 4 "cut" masks with Optical Litho, or 1 "cut" mask with EUV

- Borodovsky, Y., SEMATECH Maskless Workshop (2010)

Or, 0 "cut" masks with E-beam Litho





Lam observes that IC manufacturers will find CEBL beneficial as they search for ways to continue using their optical lithography equipment -- especially since so much of it is already amortized. It is anticipated that CEBL will be used in a mix/match manner with optical lithography for low-density critical layers (e.g., vias, line cuts, and contacts) in high-volume manufacturing.