

A-1-7
(INVITED)

X-RAY LITHOGRAPHY

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X-ray lithography has been used in the fabrication of surface-acoustic-wave, bubble-domain, and silicon MOS devices and is well suited to replicating sub-micrometer linewidth patterns. In order to be applied in the commercial exposure of silicon IC devices, however, high power sources, sensitive resists, distortion free masks, multiple mask alignment, and control of local variations in mask-to-wafer gap will be required. These items will be discussed from the point-of-view of developing design criteria for an x-ray lithography system optimized for $1/2 \mu\text{m}$ linewidths, $1/10 \mu\text{m}$ superposition, and exposure times under 200 sec.

For linewidths below $1/2 \mu\text{m}$, copper ($\lambda = 13.3 \text{ \AA}$) or carbon ($\lambda = 44 \text{ \AA}$) sources are preferred. Recent progress in replicating grating patterns with linewidths of the order of 1000 \AA with sharp vertical sidewall profiles will be described.

