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## LUX RESEARCH IDENTIFIES WINNERS AND LOSERS IN HIGH-STAKES SEMICONDUCTOR TOOLS MARKET

Liquid Immersion and Nanoimprint Lithography Will Keep Moore's Law Going for Another Decade

Austin, TX – November 16, 2004 – Doomsday scenarios say that Moore's Law -- the chip industry's ability to double transistor density every 18 months -- is coming to an end. But two new nanolithography techniques will be ready in time to sustain the chip industry's performance curve for at least another decade, according to a new report from Lux Research entitled "Optical Lithography's Last Stand," debuted today in a presentation at SEMI NanoForum 2004.

The semiconductor industry is facing a crisis as current processes for building high-performance chips reach their limits. As heat dissipation makes raising the clock speed of chips impractical -- Intel canceled plans to increase the clock speed of its Pentium processors beyond 3.8 GHz last month -- the only way chip manufacturers can sustain performance is to put more circuits into less space. That requires a new approach to the most critical step in building chips: the process of lithography, which lays down the pattern of desired circuits on a silicon wafer.

"Lithography is the single most expensive part of the semiconductor manufacturing process, accounting for one-third of the cost of each chip today," said Matthew Nordan, Vice President of Research at Lux Research. "It's also the bottleneck that stands to limit the power of microprocessors and the capacity of memory chips. With \$3.9 billion in lithography tools sold last year, it's no surprise that 10 different platforms are now competing to take over when today's process runs out of steam. All of these 10 nanolithography platforms focus on patterning circuits smaller than 100 nm in size."

For the report, Lux Research constructed an assessment tool to rank the 10 competing nanolithography platforms on their potential impact and level of development. Lux Research conducted in-depth interviews with experts on each platform to gather data and reviewed the scores with these experts to ensure accuracy. The report finds that:

- \* 193 nm liquid immersion lithography will be adopted en masse in 2007 and will be used as a stopgap solution before hitting a performance wall in 2011.
- \* Nanoimprint lithography looks best-positioned as the long-term solution after 2011 because of its technical advantages, escalating amount of research activity, and feasible solutions to technical challenges.
- \* Two wild-card platforms may outpace nanoimprint if significant technical breakthroughs are made in the next four years: Extreme ultraviolet (EUV), which has been the subject of longstanding research from the likes of IBM and Intel but has not yet proved viable, and little-known X-ray projection from startup Adelphi Technology.
- \* All other contenders are unlikely to be used for high-volume lithography.

"Semiconductor industry players will need to prepare for a radically new platform," said Will Arora, Senior Associate at Lux Research. "Semiconductor companies should assess these new platforms based on their merits, not on the millions of dollars in sunk cost plowed into some which no longer look compelling. The five nanoimprint toolmakers -- EVG, Molecular Imprints, Nanonex, Obducat, and SUSS MicroTec -- need to form a consortium to advance their common interests and battle skepticism from major chipmakers. Companies that make reduction masks and lenses should identify new ways to remain relevant should a non-optical tool like nanoimprint, which would decrease the need for their products, be adopted."

The report is available immediately to clients of Lux Research's Nanotechnology Strategies advisory service. For information on how to become a client, contact Rob Burns, Vice President, Sales, at (646) 723-0708.

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