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## GPU Based Lithography Simulation and OPC

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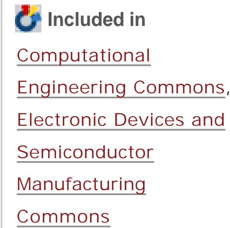

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Abstract
Optical Proximity Correction (OPC) is a part of a family of techniques called Resolution Enhancement Techniques (RET). These techniques are employed to increase the resolution of a lithography system and improve the quality of the printed pattern. The fidelity of the pattern is degraded due to the disparity between the wavelength of light used in optical lithography, and the required size of printed features. In order to improve the aerial image, the mask is modified. This process is called OPC, OPC is an iterative process where a mask shape is modified to decrease the disparity between the required and printed shapes. After each modification the chip is simulated again to quantify the effect of the

change in the mask. Thus, lithography simulation is an integral part of OPC and a fast lithography simulator will definitely decrease the time required to perform OPC on an entire chip.

A lithography simulator which uses wavelets to compute the aerial image has previously been developed. In this thesis I extensively modify this simulator in order to execute it on a Graphics Processing Unit (GPU). This leads to a lithography simulator that is considerably faster than other lithography simulators and when used in OPC will lead to drastically decreased runtimes. The other work presented in the proposal is a fast OPC tool which allows us to perform OPC on circuits faster than other tools. We further focus our attention on metrics like runtime, edge placement error and shot size and present schemes to improve these metrics.

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