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Optical Lithography on non-flat surfaces; A Case Study¹ CLAYTON MOORE, CONRAD NEWTON, WILHELMUS GEERTS, DANIEL PALMER, DAN TAMIR, Texas State University, San Marcos — Only a few studies of optical lithography on non-flat substrates have been reported. Most of these systems only work on polished very well defined substrates. For example, Ball Semiconductor developed a system for projection lithography on polished spherical balls of 1 mm diameter. We propose a system that works on an arbitrary surface and enables lithography on a wide variety of substrates including the wings of insects or a single crystalline grain of a ceramic sample. The system consists of a computer controlled laser beam that is focused through an optical microscope on an XY-table. The size of the beam can be changed by varying the size of the aperture or the change of the objective. The focus of the microscope can be automatically adjusted enabling to follow the 3D profile of the sample's surface. The laser intensity is automatically adjusted to keep the dose constant as the samples profile and the speed of the xy-table very. A cross-compiler, which utilizes principles of computer graphics to figure the required exposure parameters based on the surface of the object was developed. It accepts a text file, a vector based graphic file, or a raster image and generates a file with instructions for the laser beam writer.

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