Ionscan: Scanning and control software Proton beam writing

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The Proton beam writing technique relies on a precise beam scanning and control system that offers a simple yet flexible interface for the fabrication and design of microstructures. At the Centre for Ion Beam Applications, National University of Singapore, we have developed a suite of programs, collectively known as *Ionscan*, that cater for the specific needs of proton beam writing. The new version of *Ionscan* is developed using the *Microsoft Visual C++* development environment in conjunction with a *National Instruments* analog output card and *NI-DAQ* drivers. With the benefit of experience gained in P-beam writing over the years, numerous enhancements and new features have been added to the scanning system software since the first version of the program that was developed using *LabVIEW* [1]. These include the ability to perform combined stage and magnetic (or electrostatic) scanning which is particularly useful for the fabrication of waveguides and microfluidic channels over lengths up to 2 cm, and a dose calculator that allows the user the ability to easily determine the scan parameters for an experiment.

A new package known as *Ionutils* has also been added to the *Ionscan* suite of programs. This package is designed to allow easy conversion between the various file types that are used in the design of micromachined structures. The *Ionutils* program also gives the user the ability to design basic structures using an ASCII file format known as EMC. This format is an *AutoCAD DXF*-like file format which contains basic information on the shape and the way in which the shape is scanned.

[1] A.A. Bettiol, J.A. van Kan, T.C. Sum and F. Watt, Nucl. Instr. Meth. B 181 (2001) 49-53