Dose Prediction in Plasma Ion Implantation\textsuperscript{1} MARCEL RISCH, MICHAEL BRADLEY, University of Saskatchewan — The exact knowledge of the plasma ion current, and hence the implanted dose, is essential for materials processing, but the measurement of those quantities requires complex instrumentation. We present the computation of the ion current and dose from the sampled negative voltage pulse applied to the electrode and plasma parameters obtained by virtue of Langmuir probe measurements. Firstly, we solved the equations of the Lieberman model for the sheath width and the plasma ion current, including errors, as a function of time. Then, integration of the ion current over the duration of the voltage pulse yielded the dose and its error limits. We will compare the plasma current predictions to the plasma current measured by a Faraday cup and the dose calculation will be verified by nuclear reaction analysis (NRA). The numerical methods were proven fairly accurate and are thus a valuable tool for materials engineering.

\textsuperscript{1}This work is being supported by NSERC

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Date submitted: 09 Jul 2007