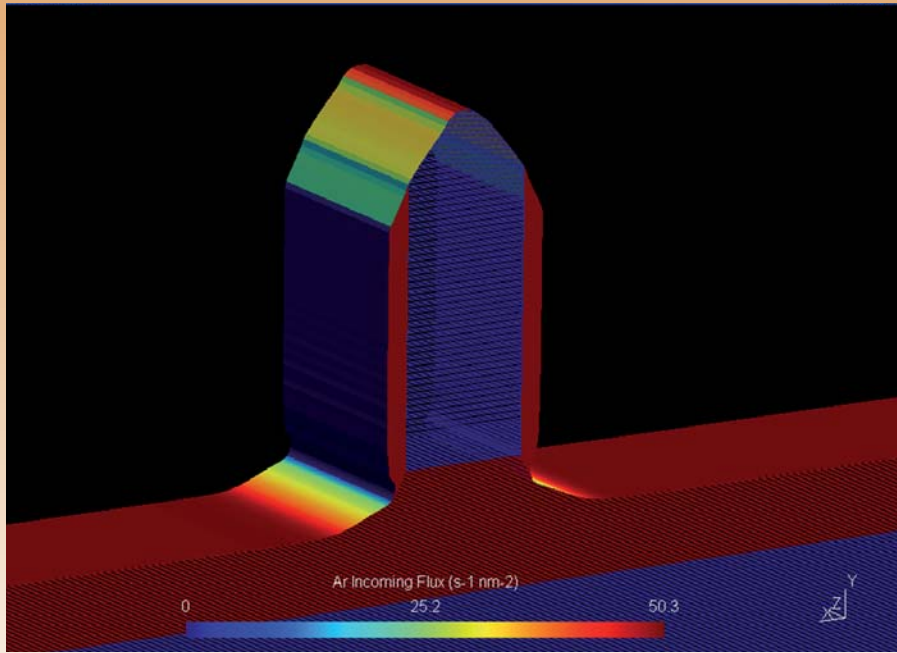


# PROTEUS 2D IBE Module

2D Etching / Deposition Simulator  
For Advanced Process Design



The Proteus 2D software product family enables detailed two dimensional simulations of HDD thin film heads nanoscale manufacturing processes on commodity desktop computers.

With the availability of Proteus 2D IBE Module, it is now possible to model the complexity of **writer pole etching and trimming processes**.

*Proteus 2D IBE Module delivers predictive and accurate simulations of etched geometry evolution and composition profiles, starting from realistic initial device geometries. This is enabled by calibrated, physics based, IBE tools and material models. An extension to support DOE driven simulations is available; with any device dimensions, material properties, or process conditions possibly defined as parameters. \**

## Overview

The Proteus 2D software product family, powered by In Silicio's proprietary physics based simulation platform, delivers at the engineer desk a new level of insight at the complexity HDD thin film head manufacturing processes. Proteus 2D predictive and quantitative simulations powerfully complement experimental process developments.

The commercial availability of Proteus 2D IBE Module is a real breakthrough, enabling HDD head process engineers to significantly reduce development time and cost associated with writer ion beam etching and trimming processes.

## Featured capabilities

### Realistic Initial Device Geometries

- Quick and easy generation of typical initial device geometry thanks to user editable template library (natural script language interface)
- User friendly geometry import from SEM/TEM/AFM data sets

### Accurate and Complete Physical Models

- Realistic ion source model (finite size, beam divergence, steering angle, source inhomogeneities)
- Complete equipment model (source to wafer distance, wafer tilt angle, wafer stage rotation, static and dynamic)
- Angular dependant etch rates
- Quantitative local shadowing calculation on arbitrary 2D device geometry
- Anisotropic sputtering plume model
- Reflected neutrals
- Support for mixed material properties

**Robust and Accurate Geometry Evolution Solver Common to the Whole Proteus 2D Software Product Family**

### Versatile Material Manager

- Standard material library included
- Easy addition of user defined materials
- Established and proven material property calibration workflows

### Natural and Powerful Recipe Scripting

- Intuitive Graphic User Interface for recipe specification
- Support for multi-step iterative processes

### Process Integration

- Seamless integration with additional process simulation modules
- Coming soon : IBD, ALD and PVD modules\*

### Post-processing and Metrology

- Geometry, composition and flux visualization
- Scriptable CD metrology

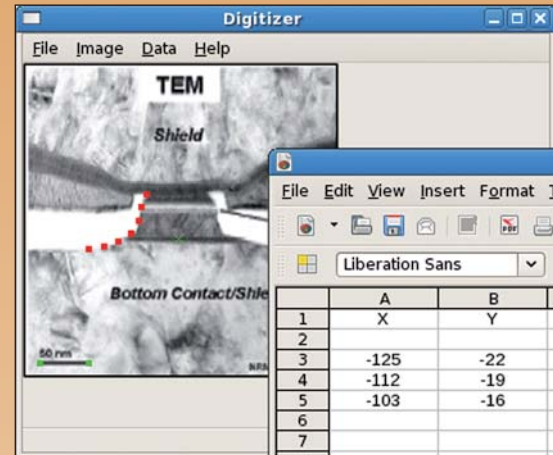
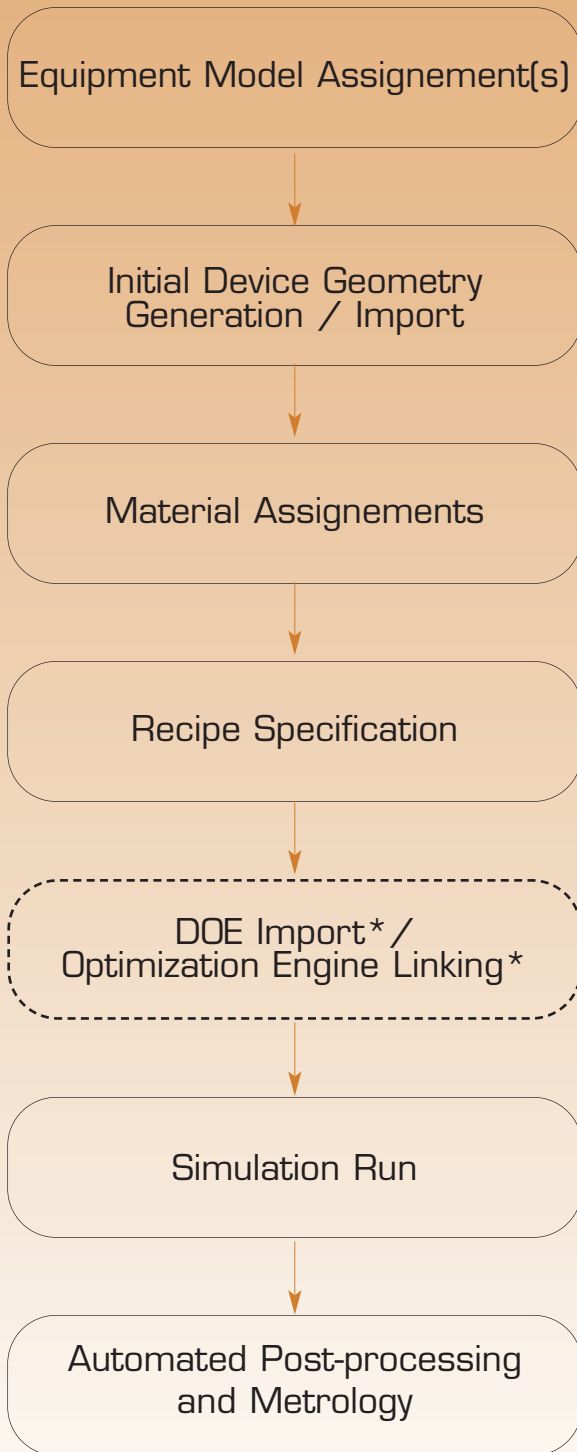
### DOE Interface\*

- Geometry, material and recipe parameterization
- DOE import for parametric analysis

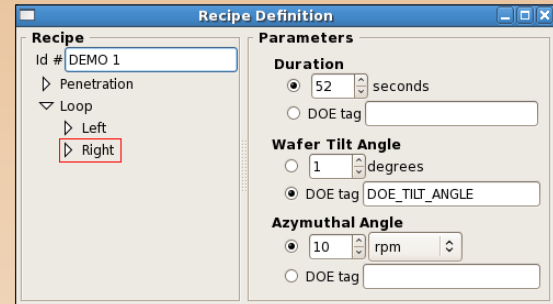
\* Optional features may be purchased at additional cost.

## Workflow

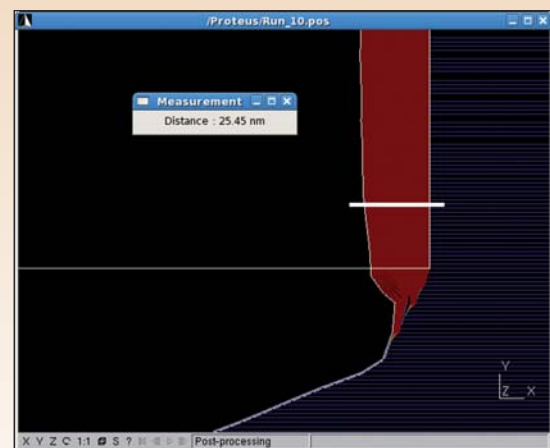
An intuitive user interface, common to the whole Proteus 2D software product family, guides the user through the successive steps of specifying the case, running the simulations and analyzing the results.



User friendly geometry import from SEM/TEM/AFM data set



Intuitive Graphic User Interface for recipe specification



Geometry, composition and flux visualization Scriptable CD metrology

\* Optional features may be purchased at additional cost.