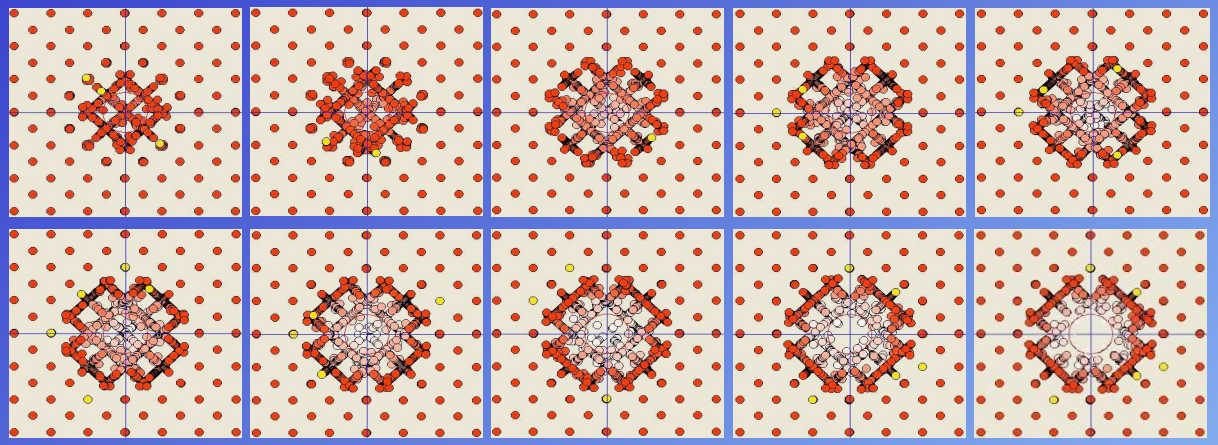
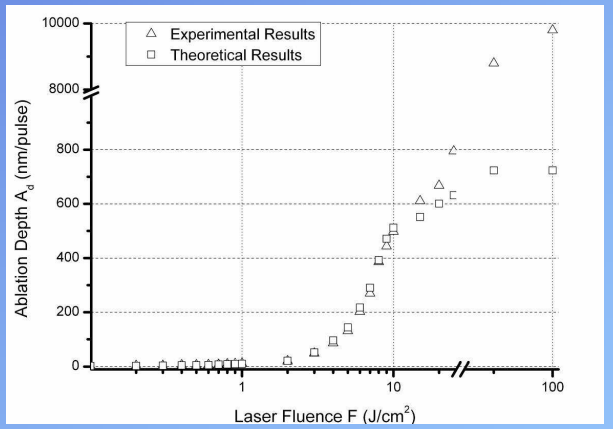
Innovative Manufacturing Processes

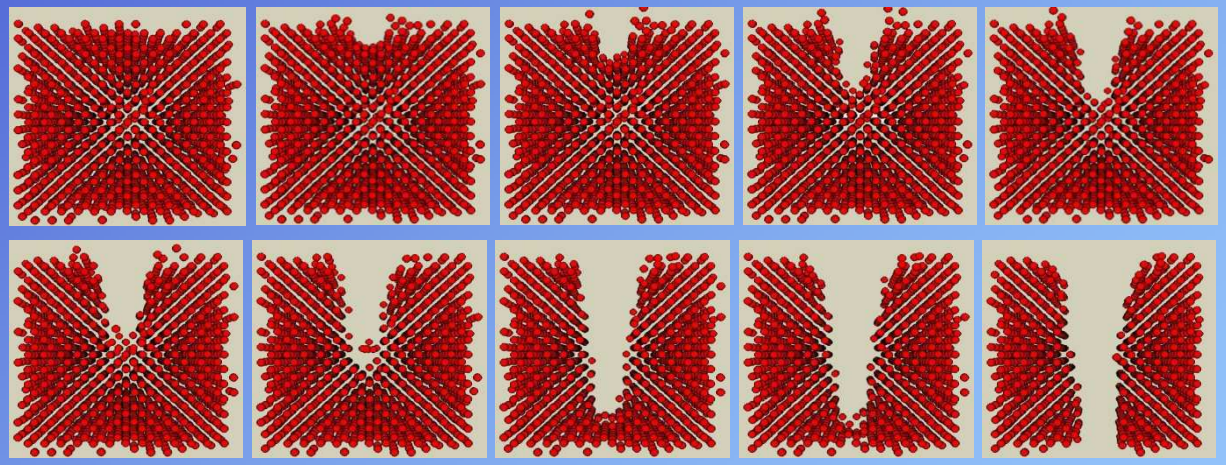
Molecular dynamics simulations of Laser ablation processes

Plan views of the ablation simulation area





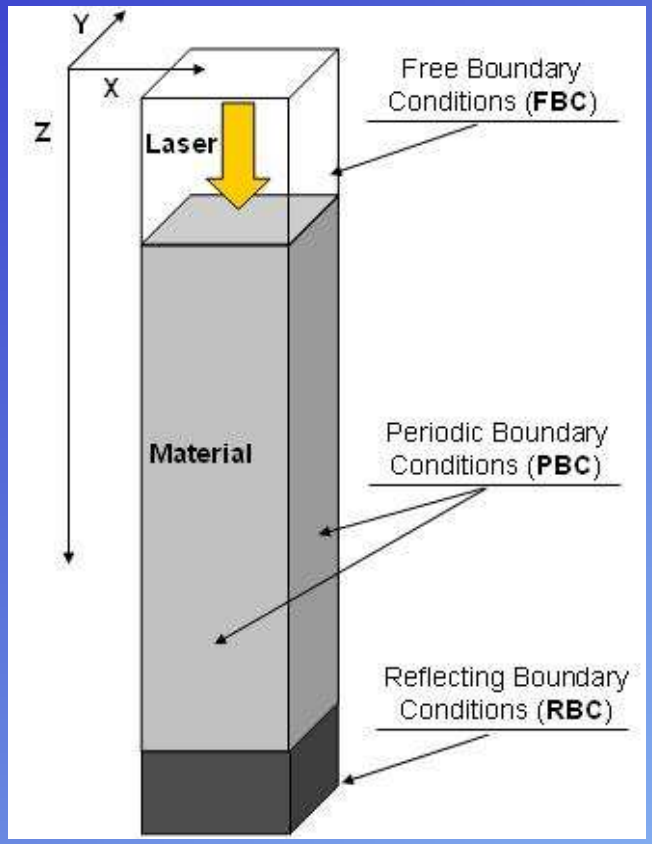
Cross sections of the ablation simulation area



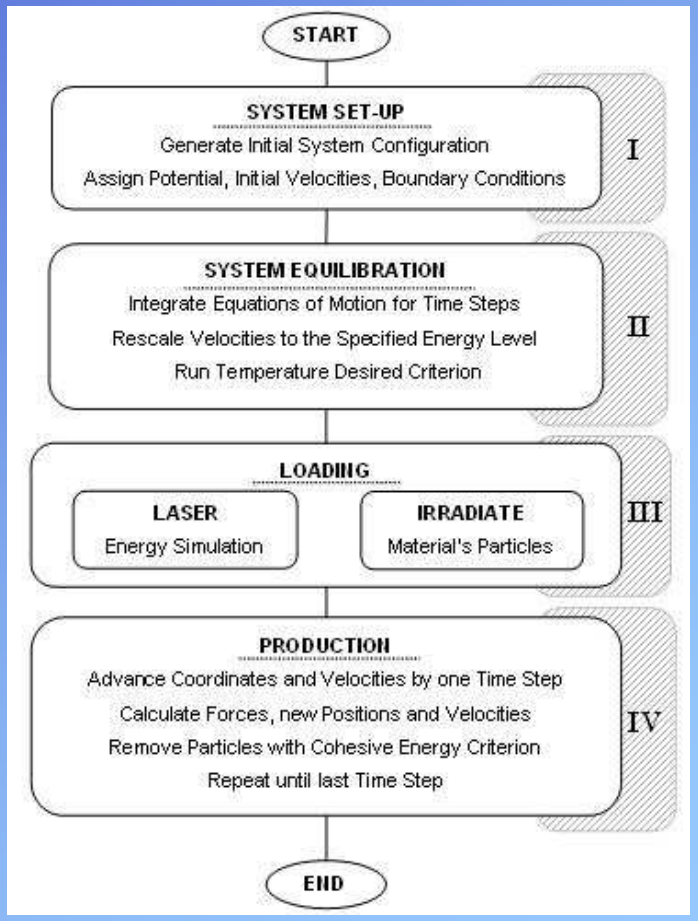
REF: Stavropoulos, P. and G. Chryssolouris, "Molecular Dynamics Simulations of Laser Ablation: The Morse Potential Function Approach", to be published in the International Journal on Nanomanufacturing, "3D Nanomanufacturing special issue", (2008).

Innovative Manufacturing Processes

Molecular dynamics simulations of Laser ablation processes



Schematic of problem decription and MD code archietecture



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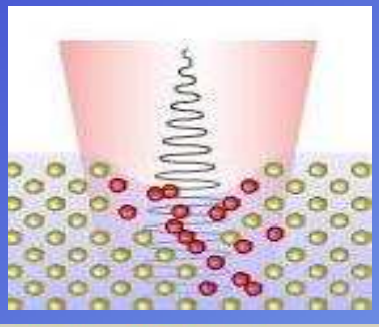
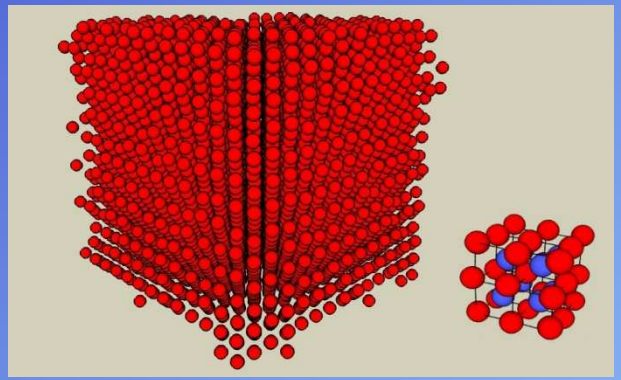
Innovative Manufacturing Processes

Molecular dynamics simulations of Laser ablation processes

Molecular Scale

- Number of removed particles
- x, y, z Coordinates of removed particles

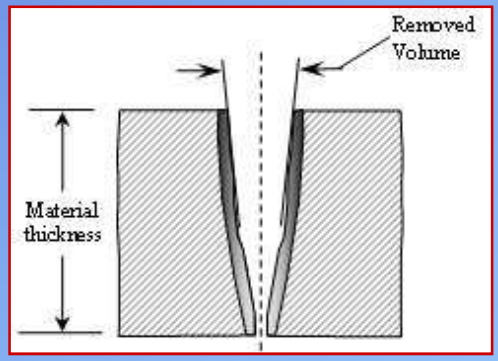


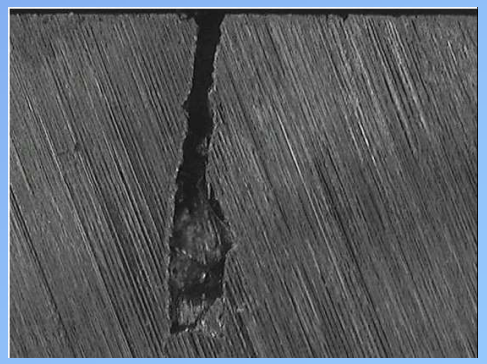


Up –scaling

Meso Scale

- Volume of the removed material





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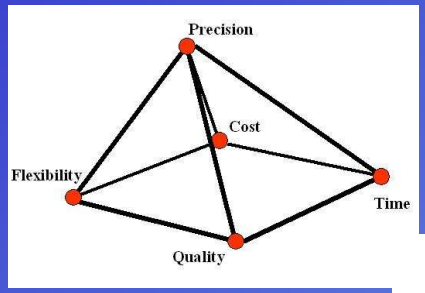
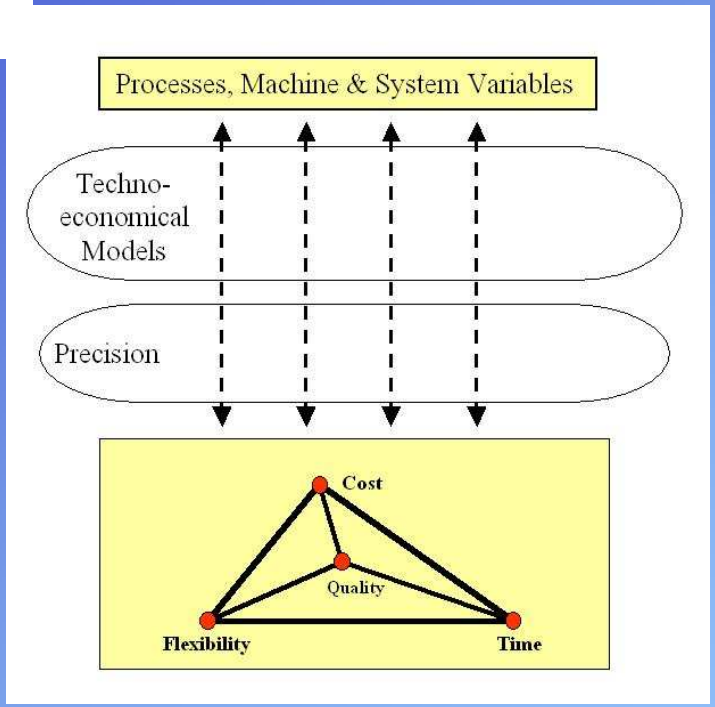
Innovative Manufacturing Processes

Nanomanufacturing and Nanomaterials Processing
Nanomanufacturing Drivers



Precision in nanomanufacturing as attribute



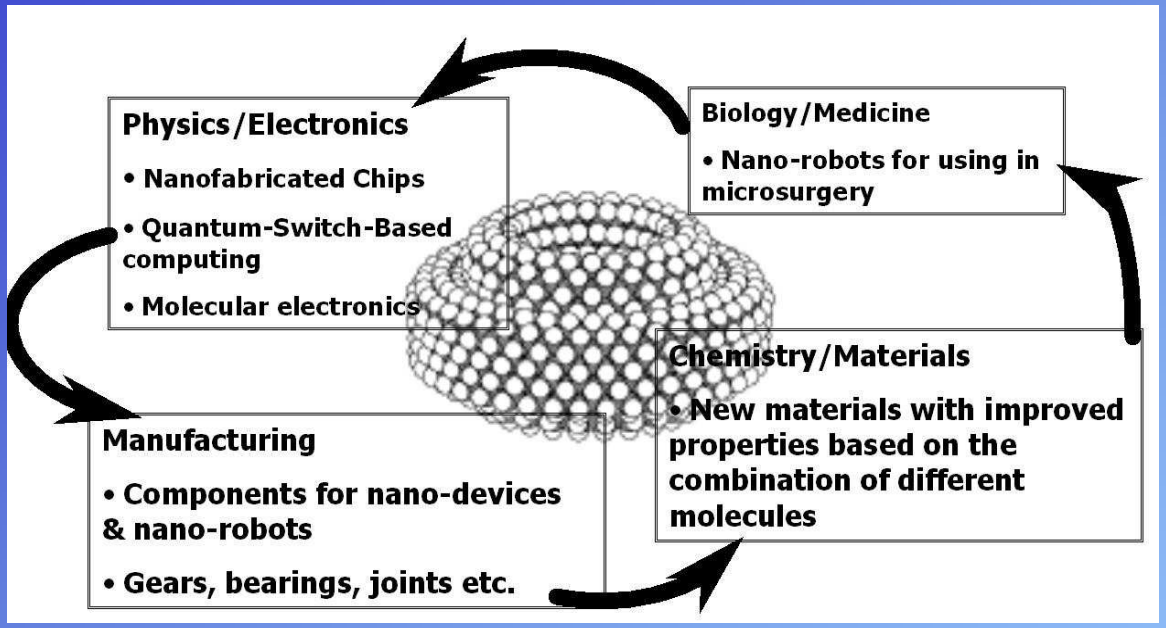
Precision as an external factor in nanomanufacturing

Similar to large-scale fabrication, nano-manufacturing issues revolve around precursor materials; fabrication processes and characterisation techniques; instrumentation and equipment; theoretical modelling and control; and design and integration of structures into devices and systems.

REF: Chryssolouris, G., P. Stavropoulos, G. Tsoukantas, K. Salonitis and A. Stournaras, "Nanomanufacturing Processes: A Critical Review", International Journal of Materials & Product Technology, (Vol. 21, No 4, 2004), pp. 331-348

Innovative Manufacturing Processes

Nanomanufacturing and Nanomaterials Processing
Nanomanufacturing Approaches



Nanomanufacturing Approaches

The domain of nanoscale structures, typically below 100nm, lies dimensionally between that of ordinary, macroscopic or mesoscale products and microdevices, or molecules

REF: Chryssolouris, G., P. Stavropoulos, G. Tsoukantas, K. Salonitis and A. Stournaras, "Nanomanufacturing Processes: A Critical Review", International Journal of Materials & Product Technology, (Vol. 21, No 4, 2004), pp. 331-348