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# SIMTRA: simulate your deposition profile

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The software package SIMTRA (Simulation of Metal Transport) developed at DRAFT is a test particle Monte Carlo code that simulates the transport of sputtered atoms through the gas phase and can be freely downloaded from the research group website (www.draft.ugent.be). Users create a virtual setup including a vacuum chamber, a magnetron and any other objects present in their chamber by using predefined geometrical surfaces. Metal particles are generated from the target and their movement inside the chamber is tracked until their path crosses one of the surfaces where they are then deposited. Several options are available to customize the generation of the particles and the description of their transport such as custom racetracks, initial energy and angular distributions, gas pressure and temperature, in- or exclude gas motion and diffusion, and several interaction potentials.
Output data consists of, but is not limited to, the number of particles deposited on each surface, their deposition energy and direction of incidence. This has been validated by measuring the deposition profile and the angular distribution at a given position with a quartz balance and a specially designed pinhole camera. Good agreement between measurements and simulations were obtained, hence we are confident to use SIMTRA for a more detailed investigation of metal transport of PVD.
Different case studies are selected to illustrate how the program can aid with optimization of deposition setups, how it can be used to predict film composition using several sources and segmented targets and how it can be used to investigate the influence of the deposition conditions on the level of biaxial alignment of a deposited coating.
The combination of an intuitive graphical user interface, the ability to construct custom setups, low computation times and free access, make SIMTRA a valuable tool for anyone active in the field of sputter deposition.

**Keywords**
sputter deposition
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transport
angular distribution