



Fluid Mechanics Simulation Software based on Lattice-Boltzmann Models (20100042, Dr. Martin Saar)

IP Status: Issued Trademark; **Application #:** 85/421,261

Lattice-Boltzmann Model Simulator Software

The Fluid Mechanics Simulation Software tool, [LBHydra®](#), is a modular, extensible Lattice-Boltzmann simulator capable of modeling a wide array of fluid mechanical behavior. The Lattice-Boltzmann methods provided are capable of simulating laminar and turbulent flows, heat and mass transport, and multiple phase and multiple component fluids in complex and changing fluid flow geometries.

The Lattice-Boltzmann based fluid mechanics simulation software's greatest benefit lies in its modularity. There are numerous areas for user input and modification in the fluid mechanics simulation, including user-defined material modules, lattice-types and subroutines, thus enabling far more complex simulations. Furthering the benefit of modularity is the ability of LBHydra to couple with other applications of the user's choice.

Additional modules provided with the simulator allow the user to accelerate simulations by harnessing the power of CUDA-compliant nVIDIA graphics processing units (GPUs). These modules transfer the calculation from CPU to GPU, thereby increasing the speed of the simulation by a factor of nearly 40x.

BENEFITS OF THE FLUID MECHANICS SIMULATION SOFTWARE

- Allows for multiple combinations of Lattice-Boltzmann simulations
- Modularity of software allows for numerous modifications and customization
- GPU-based simulations are 40x faster than traditional CPU-based simulators
- Simulations are extremely versatile

For further information see the [LBHydra® website](#).

Commercial License

There are variabilities in the commercial license for the Fluid Mechanics Simulation Software that are best addressed with a conversation. If you are interested in a commercial license please contact the University of Minnesota's [Office for Technology Commercialization](#) with your interests. A Marketing Technology Manager will contact you with further information.

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Technology ID

20100042

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