

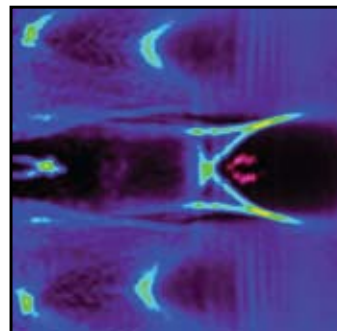
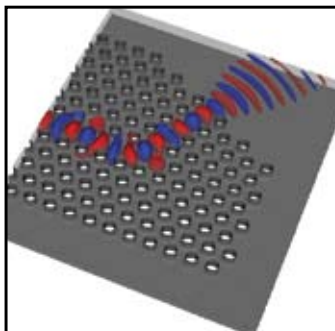
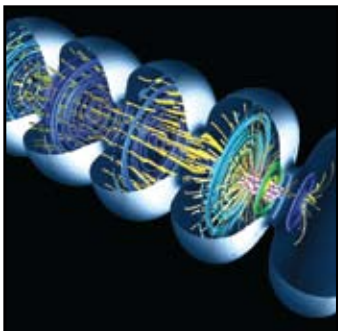
VORPAL

VORPAL allows researchers to solve the most challenging problems in RF and plasma modeling by providing sophisticated tools for electromagnetic and electrostatic simulations, both with and without particles.

VORPAL offers a unique combination of physical models to cover the entire range of plasma simulation problems. Plasma processing chambers, plasma thrusters, particle accelerators, and high-power microwave guides are only a few of the many applications benefiting from the powerful, parallel algorithms incorporated into the VORPAL framework. The software runs on a wide range of computing platforms, from laptops and desktop machines to massively parallel supercomputers with thousands of processors. The use of standard data formats allows data analysis at various levels of sophistication, including your own preferred data analysis tool.

THE VORPAL ADVANTAGE

VORPAL Studio provides a GUI-driven solution for creating and validating VORPAL input files. VORPAL can define object geometry in the input file or import complex geometries from CAD files. While VORPAL requires a regular mesh to model the simulation domain, it supports complex geometry through Dey-Mittra cut cells. VORPAL is a PIC (Particle-in-Cell) code, so it allows you to simulate the kinetic behavior of particles as well as electromagnetic phenomena. Because VORPAL supports massively parallel computing that scales to tens of thousands of processor cores, you are able to model complex geometries and more physical phenomena while still obtaining results within a reasonable amount of elapsed time. VorpableView provides a GUI-driven solution for easily plotting and analyzing VORPAL results. VorpableView provides an eigenmode and eigenvalue solver, allowing you to extract mode frequency and spatial shape information from your simulation results. Also, VORPAL output files utilize the HDF5 format, allowing you to postprocess your simulation results in your tool of choice.



SCALABILITY

VORPAL is designed to run as both a serial code for single-processor workstations and as a parallel code for systems that support MPI. Domain decomposition techniques employed in the code enable static and dynamic load balancing. Strong scaling from multi-core desktop machines up to high-performance computers with several thousands of processors has been achieved for VORPAL simulations (see graphic). The use of parallel I/O yields high performance even when thousands of processors are dumping large amounts of data. Checkpoint and restarting capabilities enable the continuation of long running simulations even if they are limited by computing center usage policies.

CONSULTING SERVICES

Tech-X Corporation offers product training and product usage consulting to help you leverage your investment in VORPAL as quickly as possible. We also provide consulting services to help you configure and optimize your VORPAL environment.

SUPPORTS MULTIPLE PLATFORMS AND STANDARD HARDWARE

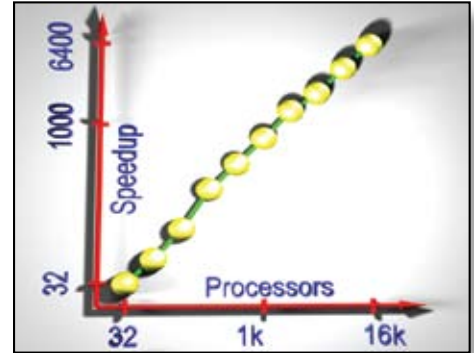
VORPAL runs on typical laptop, desktop, server / cluster hardware, and leadership class supercomputers. VORPAL supports Linux, Mac OS X, and Windows for both serial and parallel execution. For support of other UNIX platforms, please contact Tech-X Corporation.

ABOUT TECH-X CORPORATION

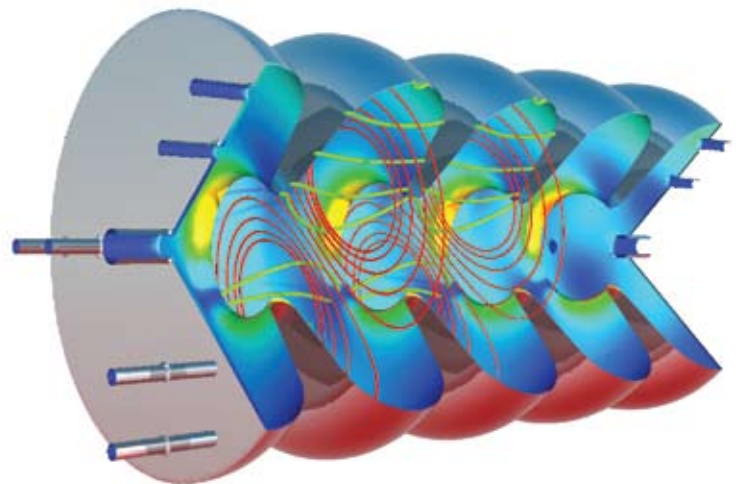
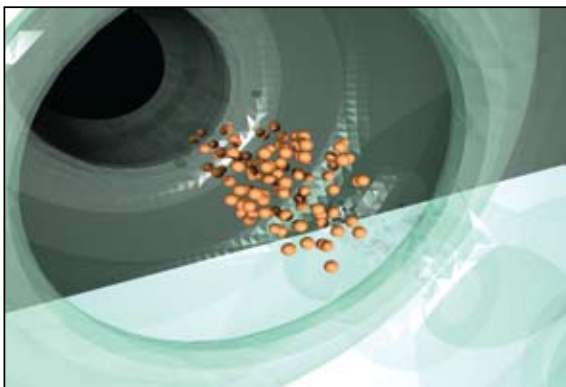
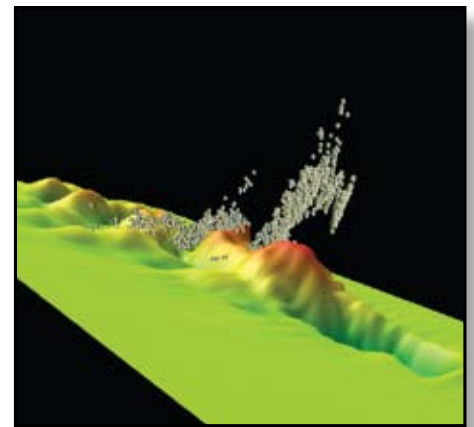
At Tech-X, we address specific research questions in science and engineering by applying our expertise in high-performance computing, modeling and data analysis, physics, grid computing, and HPC infrastructure (visualization, remote data access). Software solutions developed as part of our research efforts also support industries such as aerospace and semiconductor manufacturing.

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STRONG SCALING



VORPAL speedup on a Cray XT/4 system for fixed problem size of $768 \times 512 \times 512$ grid cells. For 16K processors, computations for local domains require only $23 \times 23 \times 23$ cells.



TECH-X CORPORATION

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