

# Parallel Computing

As one of the most popular numerical methods, the finite difference time domain method (FDTD) has been widely used to solve the electromagnetic boundary value problems. In our lab, we also use the FDTD method to design and verify the optical devices before they are fabricated. However, the single personal computer lacks the ability to simulate the desired structures when the computation region becomes very large. As such, the parallel computing provides a good solution. We choose message-passing interface (MPI) as the parallel implementation tool due to its high efficiency and portability.

Currently, we have built up two computer clusters, one has 10 nodes, and the other has 30 nodes. Equipped with such advanced computational tool, we applied the parallel FDTD analysis to many useful optical devices such as diffractive optical elements (DOE), tapered dielectric waveguides and Photonic Crystal structures.

