X-ray FEL Simulation with the MPP version of the GINGER Code*

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Abstract

GINGER is a polychromatic, 2D (r-z) PIC code originally developed in the 1980's to examine sideband growth in FEL amplifiers. In the last decade, GINGER simulations have examined various aspects of x-ray and XUV FEL's based upon initiation by self-amplified spontaneous emission (SASE). Recently, GINGER's source code has been substantially updated to exploit many modern features of the Fortran90 language and extended to exploit multiprocessor hardware with the result that the code now runs effectively on platforms ranging from single processor workstations in serial mode to MPP hardware at NERSC such as the Cray-T3E and IBM-SP in full parallel mode. This poster discusses some of the numerical algorithms and structural details of GINGER which permitted relatively painless porting to parallel architectures. Examples of some recent SASE FEL modeling with GINGER will be given including both existing experiments such as the LEUTL UV FEL at Argonne and proposed projects such as the LCLS x-ray FEL at SLAC.

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