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Additive Schwarz Methods for Elliptic Problems with Periodic Boundary Conditions

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In this presentation we discuss additive Schwarz methods for numerical solutions of elliptic problems with periodic boundary conditions. Unlike Dirichlet or Neumann type conditions that are purely local, periodic conditions are more global, therefore Schwarz type domain decomposition preconditioning techniques do not perform in the same manner as in Dirichlet or Neumann problems. In this work we study the parallel performance of one- and two-level algorithms and report experimental results obtained on the IBM BG/L. We also discuss some applications of additive Schwarz preconditioners for the numerical simulation of magnetohydrodynamics.