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RHIC and Non-Equilibrium Signals of the Deconfining Phase Transition ALEXEI BAZAVOV, BERND BERG, Florida State University — The Relativistic Heavy Ion Collsion (RHIC) experiments carried out at Brookhaven National Laboratory (BNL) provide important information about the formation and dynamical properties of Quark-Gluon Plasma (QGP). Collision of two heavy (about 200 nucleions) nuclei at the center-of-mass energy 200 GeV heats up a spatial volume of 10^3 fm^3 to temperatures at which matter undergoes a phase transition from the hadronic (confined) phase into the plasma (deconfined) phase. At these energies QCD exhibits non-perturbative regime therefore other means than perturbation theory are necessary to study the phenomena. We study the dynamics of the deconfining phase transition by performing Monte Carlo simulations in the Lattice Gauge Theory formalism. We study the response of the system to a rapid temperature quench that mimics initial heating at RHIC. We find that the deconfing phase transition proceeds through the spinodal decomposition scenario. The mechanism slowing down the equilibration of the system is a competition of domains of distinct triality (having different values of the Polyakov loop, an order parameter for pure gauge theory). We measure the structure factors and the gluonic energy and pressure densities and also relate the dynamical growth rates to the Debye screening mass. Strong correlations are found when the system is out of equilibrium but not in the final equilibrium state.

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