

UNUSUAL DILEPTONS AT RHIC
A FIELD THEORETIC APPROACH
BASED ON
A NON-EQUILIBRIUM CHIRAL
PHASE TRANSITION

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Collaborators

Dileptons - Yuval Kluger V. Koch

Field theory

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TDF - S. Y. Pi

DCC's

+ J. Dawson &

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RMIC - GREAT CHALLENGE TO FIELD THEORIST

(1) Consistent formulation of time evolution problems \hookrightarrow QFT Quantum

(2) Initial Conditions??

McClerran ... Klaus Geiser - Mueller Parton Event generator? classical?

PRODUCTION OF PLASMA

- a) Perturbative - Partons
- b) Non Perturbative Flux tube vacuum sparking - Schwinger

(4) HADRONIZATION ???

(5) THERMALIZATION ... $1/N$? Computer power??

(6) Effects of Phase Transitions Non-equilibrium

(7) Inhomogeneous evolutions - computer power??

(8) CONFINEMENT - REAL TIME

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OUTLINE:

(0) REVIEW TWO PICTURES FOR DISCUSSING NON-EQUILIBRIUM PROCESSES: (A) SCHRODINGER PICTURE-TIME DEPENDENT VARIATIONAL APPROACH

(B) HEISENBERG PICTURE- CLOSED TIME PATH PATH INTEGRAL+LARGE N

(1) DISCUSS MODEL OF THE NON-EQUILIBRIUM CHIRAL PHASE TRANSITION- O(4) LINEAR SIGMA MODEL IN A MEAN FIELD (LARGE N) APPROXIMATION

(2) NATURAL QUENCHING (COOLING) DUE TO THE EXPANSION OF THE LORENTZ CONTRACTED ENERGY DENSITY INTO THE VACUUM- (BOOST INVARIANT KINEMATICS)

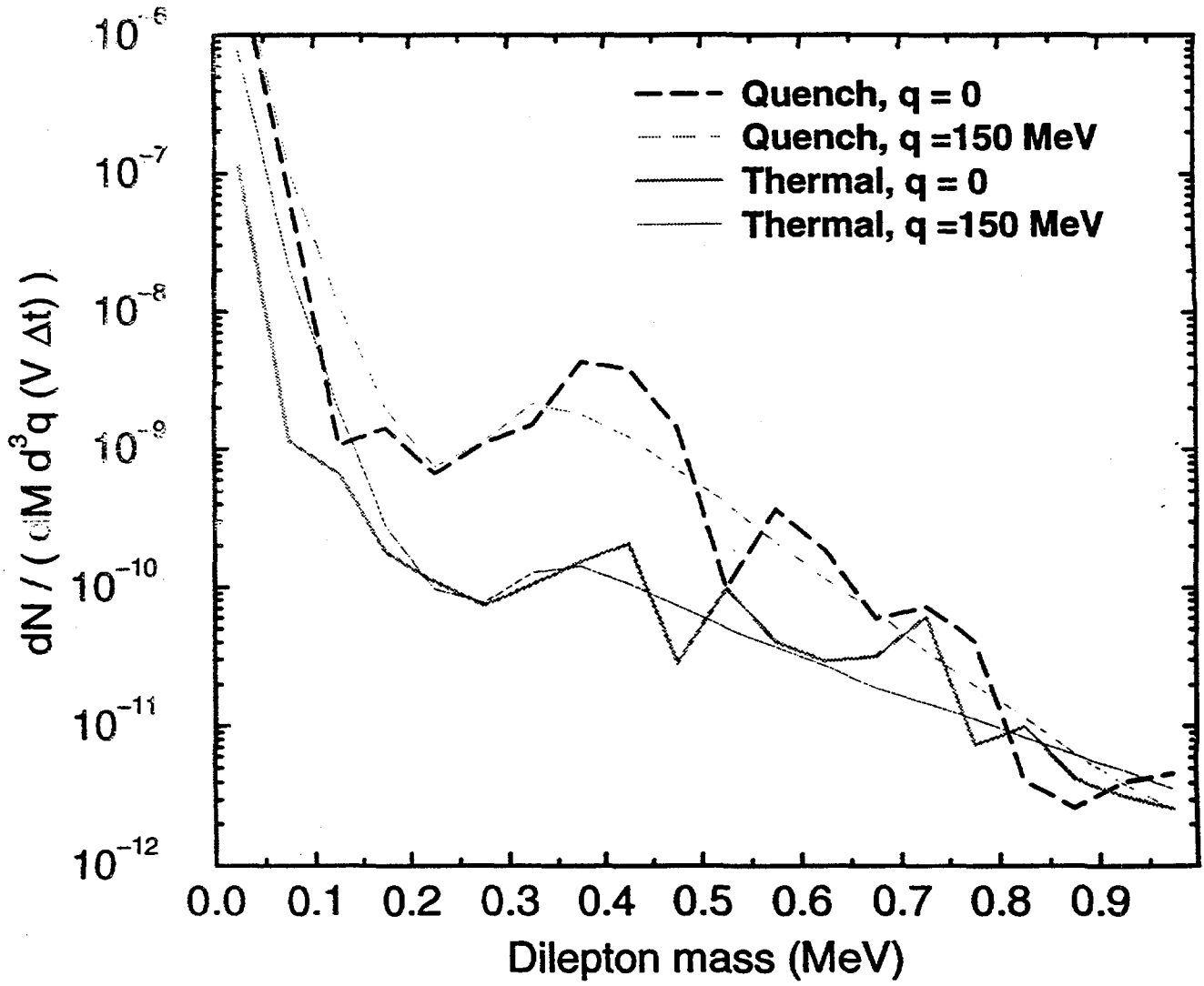
(3) THIS COOLING ALLOWS ONE TO START IN THE CHIRALLY SYMMETRIC PHASE AND END IN THE CHIRAL SYMMETRY BROKEN PHASE

(4) WE SEE THE GROWTH OF UNSTABLE MODES WHEN THE ORDER PARAMETER (EFFECTIVE MASS) GOES NEGATIVE DURING THE EVOLUTION

(5) WE SEE A LOW MOMENTUM DISTORTION IN THE SINGLE PARTICLE DISTRIBUTION OF SECONDARIES

(6) WE RECONSTRUCT TYPICAL CLASSICAL CONFIGURATIONS BY SAMPLING THE QUANTUM DENSITY MATRIX AND SEE DOMAINS

(7) WE SHOW HOW TO CALCULATE THE DILEPTONS SPECTRUM FROM THIS TIME EVOLVING PLASMA USING SCHWINGER'S CLOSED TIME PATH FORMALISM AND LSZ REDUCTION METHODS



Enhancement of low momentum pions

