both single and binary star systems (quasi equilibrium configuration) with several physical equations of state. The work is supported in part by NASA HPCC/ESS NCCS5-153, NSF Grant Nos. 96-00049 and 96-00507, and NSF Meta Center Allocation Grant No. MCA93S025.

Kiyoshi SHIRAISHI *(Yamaguchi University)*

Non-Relativistic Field Theory of "Extreme Black Holes"

We study a low-energy effective action for a scalar field coupled with electromagnetic, gravitational, and dilatonic fields. The charges of the scalar field are assumed to satisfy a critical relation, which is the same as that of "extreme black holes". Using this action, we investigate the collective mode of "extreme black holes" and statistical dynamics for the gas of "extreme black holes".

Masaru SIINO *(Tokyo Institute of Technology)*

Topology of Event Horizon

The topology of the event horizon (TOEH) is usually believed to be a sphere. Nevertheless, some numerical simulations of gravitational collapse with a toroidal event horizon or the collision of event horizons are reported. Considering the nondifferentiability of the event horizon (EH), we see that such non-trivial TOEHs are caused by the set of endpoints (the crease set) of the EH. The two-dimensional (one-dimensional) crease set is related to the toroidal EH (the coalescence of the EH). Furthermore, examining the stability of the structure of the endpoints, it becomes clear that the spherical TOEH is unstable under linear perturbation. On the other hand, a discussion based on catastrophe theory reveals that the TOEH with handles is stable and generic. Also, the relation between the TOEH and the hoop conjecture is discussed. It is shown that the Kastor-Traschen solution can be regarded as a good example of the hoop conjecture by the discussion of its TOEH. We further conjecture that a non-trivial TOEH can be smoothed out by rough observation in its mass scale.

Tejinder P. SINGH *(Tata Institute)*

A Naturalness Argument for Covered and Naked Singularities in Gravitational Collapse

We give a naturalness argument to show that both covered and naked singularities should occur generically in spherical gravitational collapse in classical general relativity, subject to the assumption of the dominant energy condition. Reference: gr-qc/9808003.

Daniel SUDARSKY *(National Autonomous University of Mexico)*

Large Fluctuations in the Horizon Area and What They Can Tell Us about Entropy and Quantum Gravity

We evoke situations where large fluctuations in the entropy are induced, our main example being a spacetime containing a potential black hole whose formation depends on the outcome of a quantum mechanical event. We argue that the teleological character of the event horizon implies that the consequent entropy fluctuations must be