Contribution ID: **44** Type: **Regular Talk**

Inhomogeneous phases and natural boundaries in LSMq under rotation

Thursday, January 23, 2025 9:40 AM (25 minutes)

Unbounded rigidly rotating systems necessarily lead to superluminal motion and are, therefore, considered pathological. Remarkably, recent studies on chiral symmetry breaking under rotation provide similar results in the rigorous bounded and formal unbounded approaches. As a particular example, we consider the linear sigma model coupled with dynamical quarks undergoing rigid rotation in unbounded Minkowski spacetime under the Tolman-Ehrenfest approximation. The thermodynamics of this rigidly rotating system induces, kinematically, an infinite local temperature state at the light cylinder, where the velocity of the system equals the speed of light. We show that the infinite-temperature cylinder serves as a natural boundary that shield the system against artifacts of superluminal motion outside of the cylinder. In addition, we demonstrate that the rotation-induced inhomogeneity of the system results into chiral symmetry restoration close to the light-cylinder. As a consequence, the rigidly rotating system cannot host a single chirally broken phase in the whole space. On the contrary, the system in a thermodynamic ground state resides in a mixed phase that comprises dynamically broken and dynamically restored phases located at different distances from the rotation axis.

Primary authors: CHERNODUB, Maxim (CNRS, Université de Tours, France); MORALES TEJERA, Sergio (West university of Timisoara); AMBRUȘ, Victor E. (West University of Timișoara)

Presenter: MORALES TEJERA, Sergio (West university of Timisoara)