Contribution ID: **129**   Type: **Poster**

Emergence of collectivity near a critical point

Tuesday, 25 June 2019 16:15 (1 minute)

Ever since the discovery of the quark-gluon plasma (QGP) the location of the critical point in the QCD phase diagram - the end point of the supposed first-order transition between hadronic matter and the QGP - has been a principal research goal for heavy-ion collision experiments at RHIC. We use the gauge/gravity duality to study a four-dimensional, strongly-coupled gauge theory with a first-order, second-order and crossover thermal phase transition. In the dual gauge theory we calculate the formation, evolution and saturation of the spinodal instability. We uncover a new surprising example of the applicability of hydrodynamics to systems with large gradients (JHEP 1706 (2017) 129 + upcoming work).

We discover with out-of-equilibrium shockwave collisions that in theories near a critical point a long-lived, quasi-static state may be formed. moreover, we show the Mueller-Israel-Stewart-type formulation of hydrodynamics to fail to describe pressures (Phys.Rev.Lett. 121 (2018), no.26, 261601) near a critical point. We provide the necessary correction terms and demonstrate that large second-order spatial derivatives need to be accounted for.

Primary authors: ATTEMS, Maximilian (Instituto Galego de Física de Altas Enerxías); Dr BEA, Yago (University of Barcelona); Prof. CASALDERREY SOLANA, Jorge (University of Barcelona); Prof. MATEOS, David (University of Barcelona); Dr ZILHAO, Miguel (University of Lisbon)

Presenter: ATTEMS, Maximilian (Instituto Galego de Física de Altas Enerxías)

Session Classification: Posters

Track Classification: Approach to equilibrium (weak & strong coupling)