Emergent Geometries from Dynamics of Quantum Gases

Z-Y Shi[1], C Gao[2], and H Zhai[3]

[1] *State Key Laboratory for Precision Spectroscopy, East China Normal University, 200062, Shanghai, China*
[2] *Department of Physics, Zhejiang Normal University, 321004, Jinhua, China. Contact Phone: +8613810384023*
[3] *Institute for Advanced Study, Tsinghua University, 100084, Beijing, China*
Contact Email: gaochao42@gmail.com

In this talk, I will give typical examples of how certain exotic geometric structures can emerge from the dynamics of quantum systems. I will mainly focus on the dynamics of quantum liquids whose evolutions are governed by hydrodynamic equations.

We proved that the dynamics of a strongly interacting quantum gas could be mapped to that of an ideal gas under certain condition [1]. We call this mapping the *idealized hydrodynamics* and show that it explains a recent puzzling experimental observation by the Pairs group in ultracold atomic gas [2].

References

[1] Z-Y Shi, C Gao and H Zhai, arXiv:2011.01415 (2020)

[2] R Saint-Jalm, P C M Castilho, É Le Cerf, B Bakkali-Hassani, J-L Ville, S Nascimbene, J Beugnon and J Dalibard, Phys. Rev. X **9**, 021035 (2019)