Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Concept of Contact Matrix in Dilute Quantum Systems[1] HE MINGYUAN, Department of Physics, The Chinese University of Hong Kong, Shatin, New Territories, HK, ZHANG SHAOLIANG[2], Department of Physics , Huazhong University of Science and Technology, Wuhan, China, CHAN HON MING, Department of Physics, The Chinese University of Hong Kong, Shatin, New Territories, HK, ZHOU QI[3], Department of Physics and Astronomy, Purdue University, West Lafayette, IN, 47906 — The diluteness of ultracold atoms leads to universal thermodynamic relations governed by contact in s-wave scattering. In this talk, I will show that the concept of contact can be generalized to an arbitrary partial-wave scattering. Furthermore, to have a complete description of the pairwise correlation in a general dilute quantum system, contact should be defined as a matrix. Whereas the diagonal terms of such matrix include contact of all partial wave scatterings, the off-diagonal terms characterize the coherence of the asymptotic pairwise wavefunction in the angular momentum space. Contact matrix allows physicists to access unexplored connections between short-range correlations and macroscopic quantum phenomena. I will discuss examples of applications of contact matrix in atomic quantum Hall states and superfluids with multiple order parameters.

[1]Funding acknowledgement: GRF/14306714
[2]Co-first author
[3]corresponding author

He Mingyuan
The Chinese University of Hong Kong, Shatin, New Territories, HK

Date submitted: 20 Nov 2016 Electronic form version 1.4