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Evidence for Bosonization in a three-dimensional gas of SU(N) fermions[1] ENTONG ZHAO, SONG BO, CHENGDONG HE, ELNUR HAJIYEV, ZEJIAN REN, JEONGWON LEE, GYU-BOONG JO, Department of Physics, The Hong Kong University of Science and Technology — A multi-component Fermi gas with SU(N) symmetry is expected to behave like spinless bosons when the number of internal states N becomes large weakening constraints from the Pauli exclusion principle. In this poster, we report direct evidence for bosonization by the measurement of contacts in a three-dimensional (3D) SU(N) fermionic gas of ^{173}Yb with tunable N. Imaging the column integrated momentum distribution with a high signal-to-noise ratio, we find that the contact per spin approaches a constant with a $1/N$ scaling in the low fugacity regime. This scaling reveals the vanishing role of the fermionic statistics in thermodynamics, and unfolds the intriguing nature of bosonization in 3D SU(N) fermions. In addition, we will discuss complementary characterization of SU(N) fermions including the collective modes and the machine learning aided study of a three-dimensional gas of SU(N), which could be alternative route to reveal bosonization.

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Entong Zhao
Department of Physics, The Hong Kong University of Science and Technology

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