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# SEMINAR

סמינר

# Resummation of diagrammatic series with zero convergence radius for strongly a correlated Fermi gas

## *Dr. Felix Werner*

*Laboratoire Kastler Brossel, Physics Department*

*Ecole Normale Superieure (ENS), Paris*

## *France*

Abstract

Making accurate predictions for strongly correlated fermions is a long-standing theoretical challenge. A new approach is being developed since 10 years. All connected Feynman diagrams are sampled efficiently up to a certain order $N_{max}$ using diagrammatic Monte Carlo algorithms. Convergence of the diagrammatic series for $N_{max}$ --> infinity was observed in several interesting situations for fermions on a lattice or frustrated spins. I will mainly consider a continuous-space model, where the series diverges strongly (the convergence radius is zero), and there is no small parameter in the strongly correlated regime. Nevertheless, we report accurate results by resumming the series using a conformal-Borel transformation that incorporates the large-order behavior and the analytic structure in the Borel plane, which we obtain by the instanton approach [1]. The specific model we consider is the unitary Fermi gas, a model of non-relativistic fermions in 3 space dimensions. We compare with ultracold-atom experimental data for the equation of state [2] and the contact parameter [3].

[1] R. Rossi, T. Ohgoe, K. Van Houcke, F. Werner, arXiv:1802.07717

[2] M. J. H. Ku, A. Sommer, L. W. Cheuk, and M. W. Zwierlein, Science 335, 563 (2012)

[3] Y. Sagi, T. E. Drake, R. Paudel, and D. S. Jin, Phys. Rev. Lett. 109, 220402 (2012)

**ההרצאה תתקיים ביום רביעי, ה-25.4.18 , בשעה 12:30**
**באודיטוריום המכון למצב מוצק, קומת כניסה**

**The lecture will take place on Wednesday, 25.4.18 at 12:30**
**at the Solid State Institute auditorium, entrance floor**

**Host:  Assistant Professor Yoav Sagi**