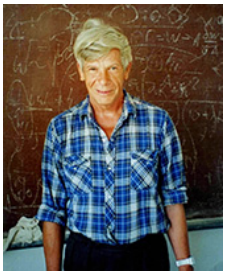

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Dynamic crititcal behaviour of superfluid phase transition

Tuesday 11 October 2022 15:20 (25 minutes)

Quantum dynamics of boson gas near the Bose-Einstein condensation transition has attracted considerable interest recently. While the static critical behavior of the system is generally believed to belong to the universality class of the XY model, [or $O(2)$ model] with the corresponding critical exponents, there is no consensus about its dynamic critical behavior and, in particular, the value of the dynamic critical exponent z. Classical papers suggest that systems with such behaviour must be described by phenomenological models of stochastic dynamics. However, due to the technical difficulties that arises in these models, there is no unambiguous answer for the dynamic critical exponent responsible for dynamic critical behaviour of the system. In our work we propose a microscopic model based on framework of time-dependent Green's function at finite temperature. With using this approach we were able to construct adequate IR model for obtaining corresponding dynamic critical exponent z. Surprisingly, at an unique IR stable fixed point our model become equivalent to the model A of stochastic dynamics. Such coincidence lead us to revisiting stochastic model F. It turns out that taking into account incompressibility effects reduce model F to the same model A. In this talk I am going briefly discuss framework of time-dependent Green's function at finite temperature then describe construction of IR effective model. Afterwards I present results of two and three loops calculation and corresponding RG analysis. Also I probably shortly discuss effects of incompressibility for stochastic field models.

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