

Program INT13-1b

Quantum Noise

May 27 – 31, 2013

Monday, May 27, 2013 – Memorial Day
No seminar

Tuesday, May 28, 2013
Room C421, Physics/Astronomy Tower

- 11:00 am: Georgy Shlyapnikov, Université Paris Sud
"Localization-delocalization transition for bosons in a 1D quasiperiodic potential"
Controlled experiments on cold bosons in optical lattices are offering promising prospects for unveiling the effects of interaction in the localized to delocalized transition of the system of particles. We aim at predicting localization properties of bosons in a one-dimensional quasiperiodic potential with account of many body effects. Analysis of the Aubry-Azbel-Harper (AAH) model with a general criterion for the delocalization critical temperature allows determination of the main features of the finite temperature phase diagram. We find notably a counter-intuitive transition from fluid to glass with increasing temperature, and also obtain a double transition (from glass to fluid and then to glass) with increasing interaction.

Wednesday, May 29, 2013
Room C421, Physics/Astronomy Tower

- 11:00 am: Julia Meyer, CEA Grenoble
"Current noise in topological Josephson junctions"
We study Josephson junctions between superconductors connected through the helical edge states of a two-dimensional topological insulator in the presence of a magnetic barrier. As the junction carries a 4π -periodic bound state in the superconducting phase difference, it was speculated that, at finite dc bias, the junction exhibits a fractional Josephson effect with half the Josephson frequency. We show that a finite bias voltage applied to the junction limits the lifetime of the bound state by dynamically coupling it to the continuum. That lifetime may be shorter or longer than the phase adjustment time for a given bound state, depending on the resistance of the circuit "seen" by the junction. We show that, in the former case, the presence of a 4π -periodic bound state manifests itself in a peak in the current noise spectrum at half the Josephson frequency, when a dc bias is applied to the junction. In the opposite case of fast phase adjustment, the 4π -periodicity is evidenced by an even-odd effect in Shapiro steps.

Thursday, May 30, 2013
Room C421, Physics/Astronomy Tower

- 11:00 am: Konstantin Efetov, Ruhr-Universität Bochum
"Bosonization of fermion gas in arbitrary dimensions: Application for analytical and Monte Carlo computations"
We suggest an exact mapping of models of interacting fermions onto boson models. The bosons correspond to collective excitations in the initial fermionic models. This bosonization is applicable in any dimension and for any interaction between fermions. We show schematically how the mapping can be used for Monte Carlo calculations and argue that it should be free of the sign problem. Introducing superfields we derive a field theory that may serve as a new way of analytical study. Some results of both analytical and numerical computations using the bosonization method are presented.

Friday, May 31, 2013
No seminar

INT Program Participants May 27 - 31, 2013

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|--------------------|-------------------------|--|-----------|-------|--------|
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| Vladimir Yudson | Inst for Spectroscopy | v.yudson@gmail.com | 5/6~5/31 | C424 | 5-9827 |

Please send your slide presentation to Inge: inge@uw.edu or bring it to her in C411D.