



Tuesday, July 26, 2016 – 10:00 h a.m.
CFEL Seminar room IV (Bldg. 99)

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Dynamics of the Transverse Field Ising Chain after a Sudden Quench

Due to experimental advances in the preparation and control of ultra-cold atomic gases, there is a widespread interest in the behaviour of quantum systems out of equilibrium. A common way to probe quantum systems for non-equilibrium phenomena is given by sudden quenches. I will present results concerning the dynamics of the longitudinal spin correlation function after a sudden quench in the Transverse Field Ising Chain. A distinguishing feature of this model is that it exhibits a quantum critical point separating a ferromagnetic from a paramagnetic phase. Furthermore, the system can be expressed as a fermionic harmonic oscillator, which allows us to determine the longitudinal correlation function after a sudden quench exactly by using Wick's theorem. In particular, I will concentrate on the behaviour of the longitudinal correlation function for quenches from an initially large external field to the vicinity of the quantum critical point within the paramagnetic phase. We conjectured a formula for the asymptotic behaviour in this case and compared it to numerical calculations of the correlator. Based on this conjectured formula, we found that the decay of the correlation function is characterized by two correlation lengths and that the correlation function attains its stationary values already at short distances.

Host: Martin Eckstein

