

Quantum Spin Chain and Ladder



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One-dimensional quantum spin models are a unique testbed for quantitative understanding of many-body physics. These models are often realised in real materials (where magnetic exchange interactions are predominant along one particular direction). This allows close comparisons between theoretical and experimental results, which is often a challenge in most cases. Examples include studies of a canonical one-dimensional quantum phase of Tomonaga-Luttinger liquid and quantum criticality. Following a brief introduction to the field, in the first half of the talk, I will illustrate realising a Tomonaga-Luttinger liquid in a spin ladder material. In the remaining time, I will demonstrate quantum-critical scaling behaviour of a spin chain material around the field-induced zero-temperature phase transition.