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MANY BODY PHYSICS FROM A QUANTUM INFORMATION PERSPECTIVE

1. Many Body Physics, Basic Introduction

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Abstract:

There has recently been a real explosion of interest in the studies of the interface between quantum information (QI) and many body systems, both in condensed matter, as well as in the physics of ultracold atomic gases. In this lecture I will introduce some basic concepts of many body physics: classical phase transitions, quantum phase transitions, low dimensional (1D and 2D) systems and their peculiarities. Most of the ideas are illustrated with the help of spin models, or quantum Bose gases providing a remainder and a background in condensed matter and statistical physics.