



School of Nano Science



IPM Condensed Matter &  
Statistical Physics Group

## Weekly Seminar

### **Massive spinons in $S=1/2$ spin chains: Spinon-pair operator representation**

Invited speaker: *Dr. Mohsen Hafez Torbati*

*Institut für Theoretische Physik, Goethe-Universität*

#### **Abstract:**

Spinons are among the generic excitations in one-dimensional spin systems; they can be massless or massive. The quantitative description of massive spinons poses a considerable challenge in spite of various variational approaches. We show that a representation in terms of hopping and Bogoliubov spinon processes, which we call “spinon-pair” operators, and their combination is possible. We refer to such a representation as second quantized form. Neglecting terms which change the number of spinons yields the variational results. Treating the bilinear and quartic terms by continuous unitary transformations leads to considerably improved results. Thus, we provide the proof of principle that systems displaying massive spinons as elementary excitations can be treated in second quantization based on spinon-pair representation.

**Wednesday, 21 Farvardin 1398 (April 10, 2019), 14:00-15:00**

**Seminar Room (Classroom A), Farmanieh Building, IPM**