

武汉物数所理论交叉学术交流系列报告

(第一八二期)

系列讲座: A Brief Introduction to Atomic Many-Body Theory

Prof. B. K. Sahoo

Physical Research Laboratory, India

波谱楼 (M楼) 1417会议室

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| Lecture 1, | 2018年1月2日 (周二) | 14:30-16:00 |
| Lecture 2, | 2018年1月3日 (周三) | 14:30-16:00 |
| Lecture 3, | 2018年1月4日 (周四) | 14:30-16:00 |
| Lecture 4, | 2018年1月5日 (周五) | 14:30-16:00 |

About the speaker:

Prof. Sahoo got his PhD at Indian institute of Astrophysics in 2006. He was the guest scientist at GSI Germany, Post-Doc at Max-Planck Institute for the Physics of Complex Systems, Germany, Post-Doc and Project Leader at KVI, Netherland. The Awards and honors he got include *Young international Scientists Fellowship award* (2010) from the Chinese Academy of Sciences, and *the CAS President's International Fellowship Initiative (PIFI)* for 2017. His research focuses on the high precision atomic many-body theory. He has over 100 publications in peer reviewed journals.



Abstract:

I intend to give four lectures, duration for each about 1.5 hr, to learn about the basic concepts of atomic many-body methods that can be employed to calculate spectroscopic properties very accurately. The aim of the lectures is to help the beginners of the field to gain insights into the some of the important concepts before adopting a method for calculations that are essential from the theoretical point of view. Both the experimental and theoretical studies go hand-in-hand in every field of research. I will also discuss some of the theoretical concepts based on which an experimentalist can choose to compare their results with the theories that are more valid to interpret the measurements. For this purpose, I will start from very basic formalism of theories and follow the essential steps needed for the better understanding of atomic many-body methods. Only the preliminary knowledge of quantum mechanics at the undergraduate level would be required to attend this course. These lectures will mainly cover the following broad topics: Essential of spherical coordinate system for atomic theory, Problem with the two-body interactions, Hartree-Fock theory, Slater-Condon rules, Koopman's Theorem, Angular momentum Theory, Perturbation Theory, Configuration Interaction method, Extensivity properties, Coupled-cluster theory and connection with other methods, etc.

主办单位:武汉物数所理论与交叉研究部