

Particle Physics with Muon

Abstract:

Muon, 2nd-generation counterpart of electron, had discovered without any predictions almost 80 years ago has been played, is playing and will play very important role in the development of particle-physics discipline. In this lecture, a brief history of particle physics with muon, property of muon and recent hot topics with muon will be reviewed. The forthcoming muon experiments trying to discover a very rare phenomenon not-yet-seen-but-wanted-to-be-seen will be also introduced.



COMET Experiment (Reprinted with permission courtesy of Dr. Benjamin Edward Krikler)

Lecturer: Masaharu AOKI





Spintronics ~from the viewpoint of fundamental physics~

Abstract:

Spintronics is one of the new research fields in condensed matter physics. In conventional electronics, the charge of electron conveys information, while in spintronics, two degrees of freedom, i.e., both charge and spin, play an important role. In recent years, spin current, flow of only spin angular momentum, has attracted much attention since it could be useful for the next generation low power devices. In addition to such engineering aspects, it could also be used as a probe to detect spin related phenomena in a sensitive manner. In this lecture, I focus on such fundamental aspects of spin current.



Lecturer: Yasuhiro Niimi





Spin qubits using quantum dots for quantum network

Abstract:

In recent years, quantum technologies based on the control and measurement of quantum states in solid states have made significant progress towards the realization of quantum computers and quantum networks. In this talk, spin qubits using semiconductor quantum dots will be focused and the current status and prospects of their development, including photon-spin quantum state conversion and its application to long-distance quantum communications will be discussed.



Lecturer: Akira Oiwa (SANKEN, Osaka University)





An introduction to holographic duality

Abstract:

Holographic duality postulates the equivalence between gravity and quantum system in one lower dimensions. A prominent example is the AdS/CFT correspondence, which relates gravitational theories on Antide Sitter (AdS) spacetime to conformal field theories (CFT), which shed new light on the fundamental nature of our universe. I will review the principle of holographic dualities with the emphasis on their quantum informational aspects, and their applications to understanding strongly-coupled dynamics of quantum field theories and black hole physics.



Lecturer: Tatsuma Nishioka

