Physics / Astrophysics
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Spintronics

Speaker:

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Spintronics - Achievements and Challenges

Semiconductor spin electronics is a major and still growing branch of research in today's solid state community. I will report on recent developments concerning effects of spin-orbit coupling in semiconductor nanostructures. After giving a general introduction to the issue of spin-orbit interaction in a wide class of III-V binary semiconductors, I intend to cover the following topics: \begin{itemize}

* Nonballistic spin field-effect transistor
  The concept of a spin field-effect transistor is indeed a paradigm of the field of spintronics.

* Spin Hall effect, a very recent and intensively investigated issue.

* Zitterbewegung of electronic wave packets
  This effect constitutes the possible solid-state realization of an old prediction from relativistic quantum mechanics.