- Josef WEINBUB (Wien), ***Single Electron Control for Quantum Interference Devices***

  The general field of quantum electron optics offers fascinating ways for future advanced logic devices. One such way is to control the electron coherence to realize quantum interference devices. This control is motivated by Young double-slit setups or Aharonov-Bohm rings; both are fundamental structures to control the interference pattern of electrons. Alternatively and at the center of our research, electron control can be established by specifically shaped electric potentials, called lenses, which can manipulate a single electron state in various specific manners. Furthermore, it has been observed that the operation of such lenses can be also realized by two potential wells, such as the potentials of two electrostatic gates placed above a two-dimensional conductive channel and separated by a dielectric. A well-pronounced interference pattern can be specifically engineered, which can be dynamically controlled by adapting the potential wells. The thus acquired ability to electrostatically manipulate the interference pattern opens up a path for a new type of single electron quantum interference devices, enabling a new approach for quantum electronic based advanced logic devices and systems.

  This talk will summarize the research in this area and will provide an outlook, including potential applications in the associated and emerging field of entangletronics.