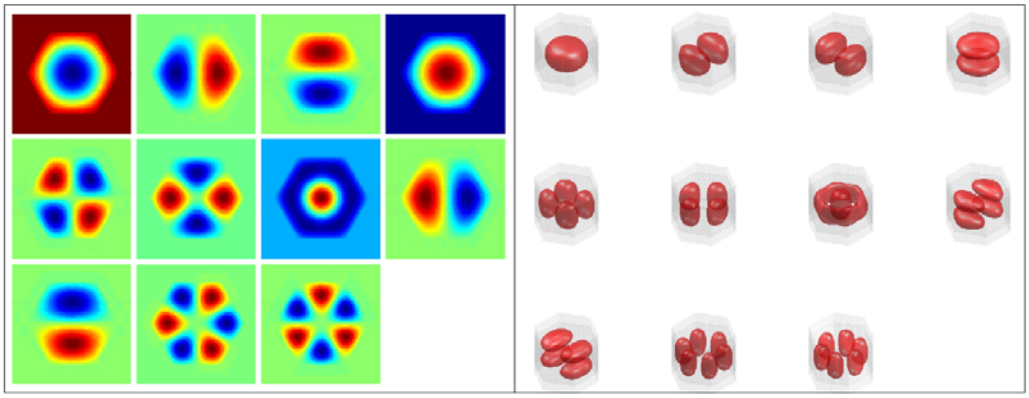
NTNU NanoLab

Modelling of quantum dots within semiconductor nanowires

Semiconductor nanowires are of large fundamental and technological interest due to a high level of flexibility in the material and structural composition. The electro-optical properties of the nanowires can be modified by growing quantum dots (QDs) within the wires. Such QDs are especially promising as single photon sources, due to good control of their size and shape. To predict the optical transition probabilities, the wavefunctions of the electrons and holes in GaAs QDs in an AlGaAs nanowire are calculated using the k·p method. The QDs are highly symmetric with hexagonal cross sections. Tools from group symmetry can therefore be used to obtain better understanding of the transitions. The work is carried out at the Dept. of Electronics and Telecommunications and UniK (Kjeller), in collaboration with EPFL (Switzerland).



Electronic wavefunctions in GaAs QDs in an AlGaAs nanowire.

Contacts: Guro Svendsen or Helge Weman, Dept. of Electronics and Telecommunications, NTNU.