

The investigation of transport properties of the quantum dots is yet one of the active and interesting research fields in the theoretical and experimental condensed matter physics. This is mainly due to the possibility of engineering various arrays of them on a chip as well as tuning their energy levels and even their interactions very precisely in the laboratory. In this talk, I will consider the capacitive interaction between a charge qubit and a (or two) quantum dot and discuss the signatures of such interaction on the transport properties of the quantum dot. It will be shown that though this interaction seems to be simple, its consequences could be highly nontrivial. In particular, I will show that when the quantum dot is strongly coupled to the qubit, an attractive electron-electron interaction will be induced in the quantum dot. In this case, the quantum dot will exhibit a charge-Kondo effect and also a bistability in its electric current. Moreover, within the weak coupling regime, the differential conductance of the quantum dot could be used as an indirect probe to measure the average charge state of the qubit.