Tuning of the Fano resonance through the double quantum dots under microwave irradiation

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Electrical transport experiments on two lateral quantum dots coupled in series are investigated. Capacitive coupling of the two quantum dots is directly tuned electrostatically via central gate. The double dot conductance was measured as a function of the induced charge on each dot and of the interdot tunnel conductance to demonstrate the evolution of the charging diagram with increasing interdot electron tunneling. With microwave spectroscopy it is possible to probe the transition from coherent transport to Fano resonance in a double dot system. While the Fano resonance has been observed in a variety of physical systems, the present system is the first convincing realization of a Fano system that can be tuned under microwave irradiation. In this study, we have measured the DC transport characteristics of the double QDs under microwave irradiation. The microwave signal effectively coupled to and modulated the Coulomb oscillation. Furthermore, with microwave spectroscopy it is possible to probe the transition from coherent transport to Fano resonance in a double dot system. Finally, an explanation based on the interference between the discrete resonances and the incoherence tunneling path is presented.