Solid State Institute
המכון למצב מוצק

TECHNION
Israel Institute
of Technology

הטכניון
מכון טכנולוגי
לישראל

SEMINAR

סמינר

The indistinguishability of single photons emitted from single semiconductor quantum dots

Malka Shapiro

Department of Physics and The Solid State Institute,
Technion

Abstract

Semiconductor quantum dots are excellent interface between confined - anchored spin qubits and photons- flying qubits. They are currently the leading sources of single and entangled photons on demand. Therefore they are seriously considered for applications in quantum information processing in general and in quantum communication, in particular.

Since two photons do not interact, logical gates between photonic qubits are achieved using interference. In order that two-photons efficiently interfere they must be identical or indistinguishable.

In my talk I will present an experimental and theoretical study of the indistinguishability between polarization entangled photons in a cluster state emitted from a periodically resonantly excited single semiconductor quantum dot.

The model that I developed is compared with the experimental measurements which quantify the degree of photon indistinguishability within the cluster's photon at various experimental conditions. In particular I was able to quantify the influence of an externally applied magnetic field on the indistinguishability as well as the influence of the internal Overhauser magnetic field due to fluctuations in nuclei spin orientations in the vicinity of the quantum dot.

ההרצאה תתקיים ביום רביעי, ה-22.06.22 בשעה 12:30
באודיטוריום המכון למצב מוצק, קומת כניסה
The lecture will take place on Wednesday, 22.06.22 at 12:30
at the Solid State Institute auditorium, entrance floor

M.Sc. Student of Professor David Gershoni