

## Quantum dot qubits for quantum information

Muzaffar Qadir Lone <sup>1\*</sup> and Mudasir Ahmad Mir <sup>2</sup>

<sup>1</sup> Department of physics, University of Kashmir, Srinagar, Jammu and Kashmir-190006, India.

<sup>2</sup> Department of physics, NIT Srinagar, Jammu and Kashmir-190006, India.

\*Corresponding author: [lone.muzzafar@gmail.com](mailto:lone.muzzafar@gmail.com)

**Abstract:** Quantum computation relies on the very quantum features of systems, namely, entanglement and quantum superposition. Due to the ubiquitous presence of system environment interactions, the quantum coherence is degraded; on total destruction of the quantum superposition, classicality emerges. The protection of quantum states against decoherence due to interaction with the environment is essential to the development of quantum computational architecture. Using control techniques, achievement of long coherence times can be achieved in GaAs and silicon based double quantum dots where the qubit information is encoded in singlet-triplet states involving two spins.