Abstract:

Nitrogen-vacancy (NV) center in diamond is one of the most prominent candidates for a nanoscale quantum sensor, owing to its spin-dependent optical properties. We will discuss the NV center optical properties, and how to utilize electron beam lithography to create these atomic defects in a pre-defined array. With optically-detected magnetic resonance techniques, the NV centers can act individually as probes for local environments, and collectively as an imaging tool. Finally, we will investigate the limitations to the sensitivity of these NV centers by optically probing their charge state dynamics.