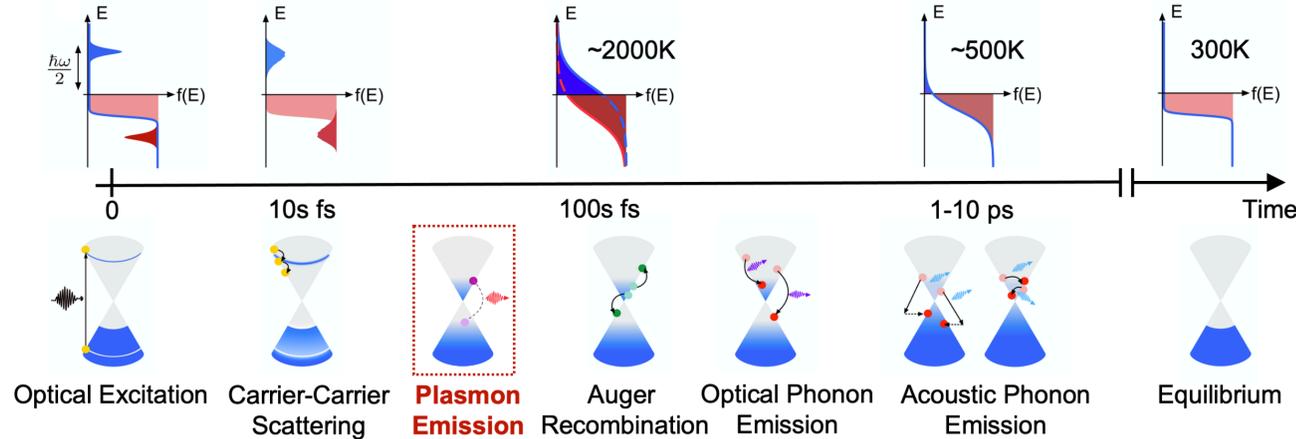
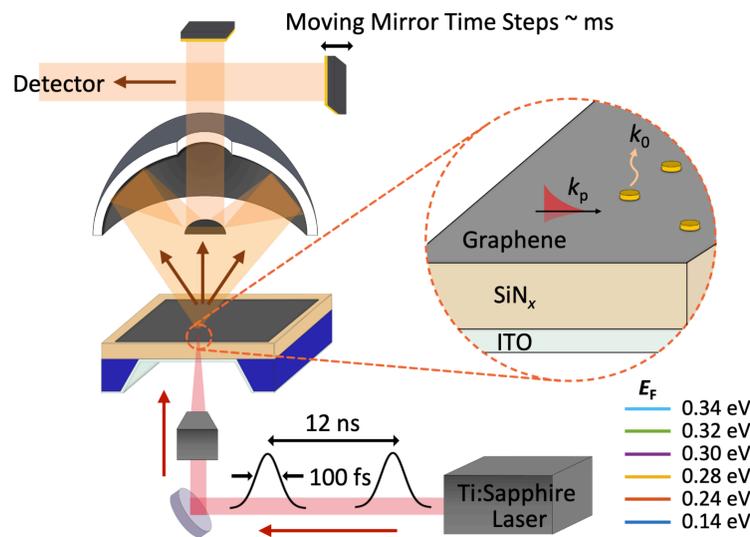


Mid-Infrared Light Emission from Bright Hot Plasmons in Graphene

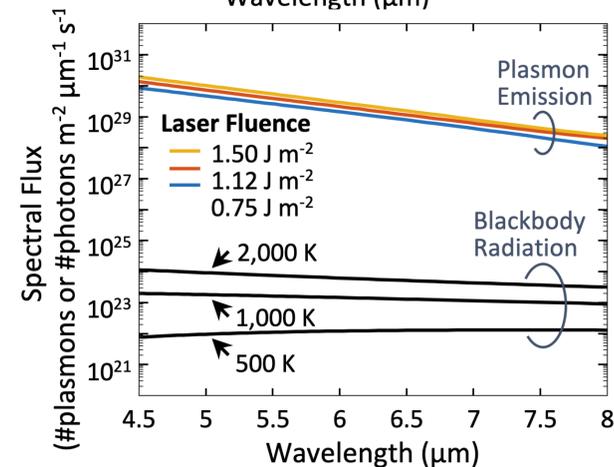
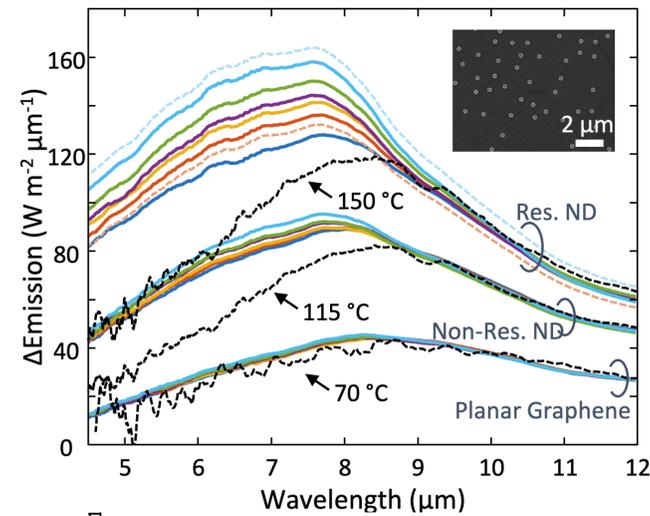


- Plasmon emission is an efficient and dominant 100-fs decay pathway that has been largely overlooked.
- This work represents the first experimental demonstration of hot-plasmon-induced light emission.

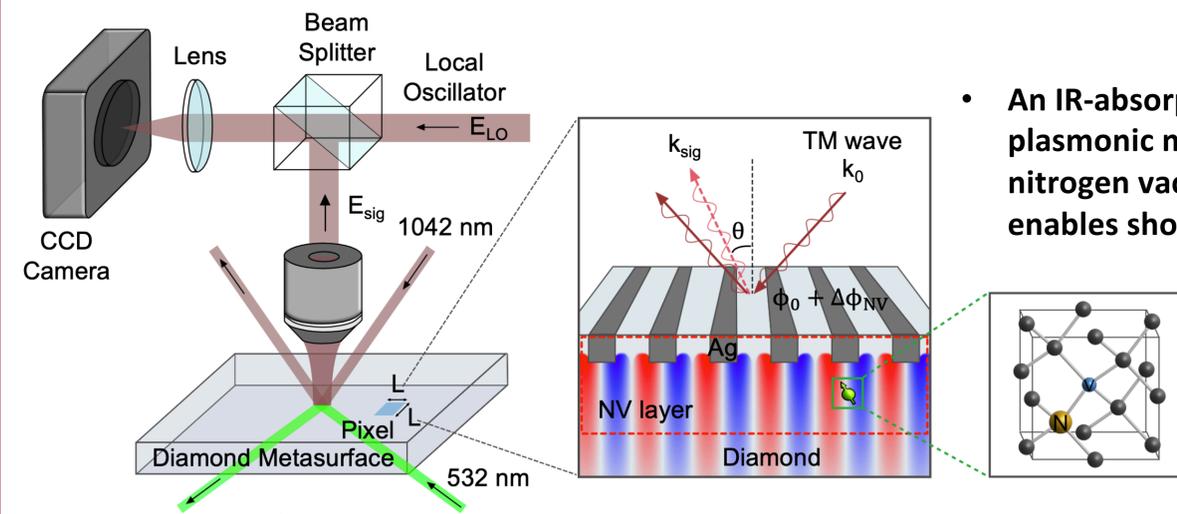


- Gate-dependent emission spectra under ultrafast optical excitation show non-Planckian behaviors.
- Plasmonic nanodisks with surface coverage of <3% act as instantaneous out-couplers and enhance far-field emission intensity.
- TM-polarized emission is further confirmed with graphene nanoribbon structures^[1].
- Several orders of magnitude brighter than blackbody emitters at 1000s K

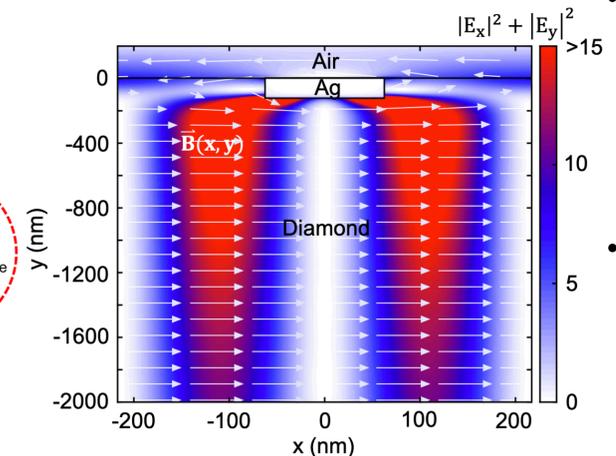
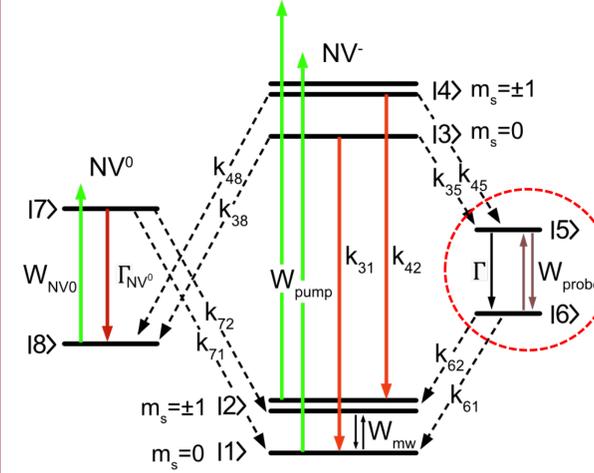
[1] L. Kim et al. arXiv:2001.11052 (2020).



Diamond Spin Microscopy on a Plasmonic Quantum Metasurface



- An IR-absorption-based diamond plasmonic metasurface containing nitrogen vacancy (NV) spin ensembles enables shot-noise-limited detection with a standard camera, eliminating the need of single photon detectors for wide-field imaging.



- Surface plasmon polariton/Rayleigh-Wood anomaly hybrid mode optimized for ensemble-based sensing
- Can achieve uniform MW delivery over a large sensing area for efficient interrogation of NV ensembles

- Sensitivity below nT per μm^2 sensing area
- Potential applications include spatially resolved NMR detection and imaging of biological systems and quantum magnetism and superconductivity in quantum materials.

