Quantum plasmonic nano-imaging of few-layer MoS$_2$. DMITRI VORONINE, Texas AM University — Transition metal dichalcogenides such as MoS$_2$ are promising 2D materials with many applications. Their diffraction-limited optical characterization using Raman spectroscopy provides important structure-functional information. In this work, nanoscale tip-enhanced Raman scattering (TERS) signals of few-layer MoS$_2$ are presented and limits of signal enhancement are investigated by varying the tip-sample gap. Quantum plasmonic quenching of gold photoluminescence signals was observed for subnanometer gaps. Similar quantum plasmonic behavior was observed for more than 3 nm gaps between gold substrate and tip with few-layer MoS$_2$ junctions. These results may be used for designing new generation quantum optoelectronic devices.