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## Quantum enhancement towards sensitive molecular vibrational imaging

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### Abstract

Stimulated Raman scattering (SRS) microscopy is regarded as a sensitive molecular-vibrational imaging method, opening up various biomedical applications including label-free imaging, metabolic imaging, and supermultiplex imaging. The quantum enhancement (QE) of SRS is attracting attention for achieving sub-shot-noise sensitivity, while previous QE-SRS suffered from low optical power, which limits the sensitivity. Here we present QE-SRS microscopy in high-power regimes ( $>30$  mW) that are comparable to classical SRS microscopes. We demonstrated QE-SRS imaging with 2.89 dB noise reduction compared with classical balanced detection SRS microscopy, paving the way for breaking the sensitivity of classical SRS microscopes.