



Miniaturized spectrometers with a tunable van der Waals junction

Systems

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ABSTRACT

Miniaturized computational spectrometers, which can obtain incident spectra using a combination of device spectral responses and reconstruction algorithms, are essential for on-chip and implantable applications. Highly sensitive spectral measurement using a single detector allows the footprints of such spectrometers to be scaled down while achieving spectral resolution approaching that of benchtop systems. We report a high-performance computational spectrometer based on a single van der Waals junction with an electrically tunable transport-mediated spectral response. We achieve high peak wavelength accuracy (~ 0.36 nanometers), high spectral resolution (~ 3 nanometers), broad operation bandwidth (from ~ 405 to 845 nanometers), and proof-of-concept spectral imaging. Our approach provides a route toward ultraminiaturization and offers unprecedented performance in accuracy, resolution, and operation bandwidth for single-detector computational spectrometers.

The full article can be found here:
<https://www.science.org/doi/abs/10.1126/science.add8544>