

# Fano resonances from plasmon-exciton coupling in hetero-bilayer $\text{WSe}_2\text{-WS}_2$ on Au nanorod arrays

Jinlin Zhang, Manpreet Boora, Taylor Kaminski, Chito Kendrick, Yoke Khin Yap, Jae Yong Suh (Michigan Tech)

Plasmon-exciton coupling in hetero-bilayer of  $\text{WSe}_2$  and  $\text{WS}_2$  transferred onto Au nanorod arrays is studied. Dark-field scattering measurements reveal that the in-plane dipole moment of excitons in monolayer  $\text{WS}_2$  allows only the narrow spectral range of 30 nm for the resonant coupling between the localized particle plasmons from Au nanorods and the bright excitons from  $\text{WS}_2$ . We demonstrate that the  $q$ -parameter that represents the asymmetry of Fano resonances from plasmon-exciton coupling can be controlled by the polarization states of incident light. Surface lattice resonances in between individual Au nanorods play a role to diminish the damping factor of plasmon-exciton coupling in the arrays.

Published in *Photonics and Nanostructures: Fundamentals and Applications* 38, 100783 (2020).

