Ultrafast dynamics of Bloch surface wave polaritons in large-area 2D semiconductor monolayers

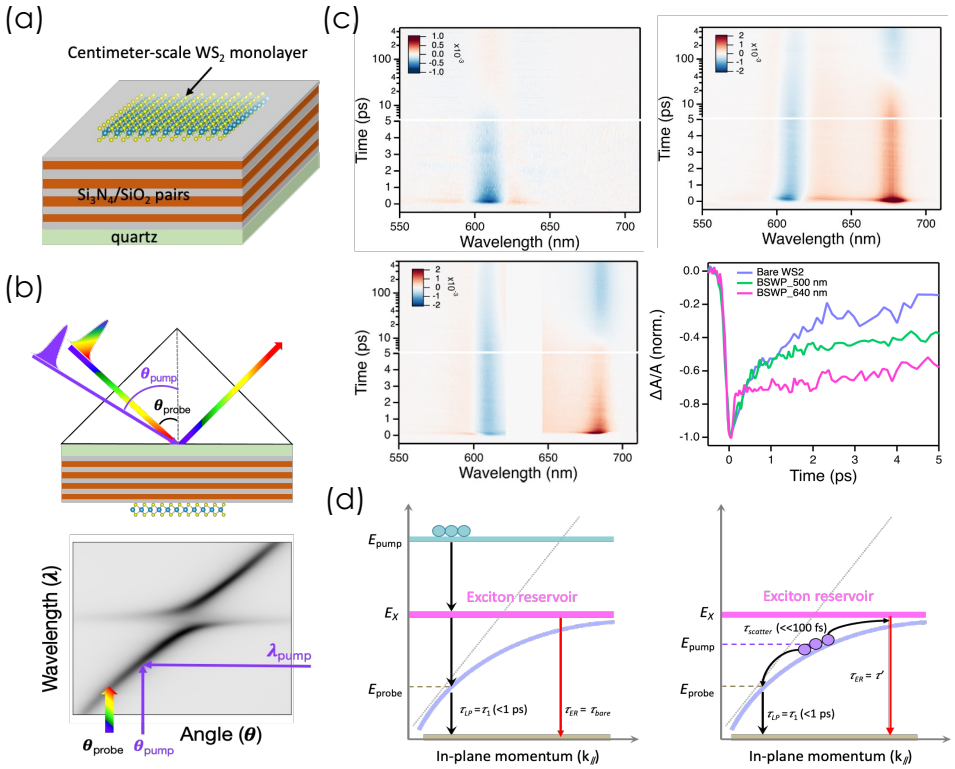

Figure: (a) Scheme of a device structure. (b) Polariton-resonant pumping scheme. (c) Pump-probe measurement results from a bare WS_2 monolayer (top left), from a BSWP sample under non-resonant (top right) and resonant pump (bottom left). Bottom right: Comparison of early-time kinetics of exciton reservoir (d) Relaxation mechanisms of the excited state dynamics in BSWP systems under different pumping schemes.

Objective

➢ To Investigate the excited state dynamics in transition metal dichalcogenide (TMD)-based polariton systems under different pumping schemes

Impact

The dynamics of strongly coupled polariton systems integrated with 2D TMD is key to enabling efficient coherent processes and achieving high-performance TMD-based polaritonic devices. Studying the dynamics of TMD-based polariton systems under different pumping schemes, non-resonant versus resonant excitation, is crucial for developing device applications, such as polariton lasers, ultrafast optical switches, polariton-mediated long-range energy transport, or nonlinear polariton parametric emission.

Facilities and Methods Used

- Plasma Enhanced Chemical Vapor Deposition
- Fourier-Plane Imaging Microscopy
- Ultrafast pump-probe spectroscopy

Relevant Papers

- B. Liu, et Al., *Advanced Materials,* DOI: 10.1002/adma.202404286

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