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Unusual Photoluminescence in Ultrathin MoS_2 LIANG SUN, Phys. Dept., UC Berkeley, ANDREA SPLENDIANI, Phys. Dept., UC Berkeley, Scuola Galileiana di Studi Superiori di Padova, YUANBO ZHANG, Phys. Dept., UC Berkeley, TIANSHU LI, Chem. Dept., UC Davis, JONGHWAN KIM, CHI-YUNG CHIM, Phys. Dept., UC Berkeley, GIULIA GALLI, Chem. Dept., UC Davis, FENG WANG, Phys. Dept., UC Berkeley, Materials Science Division, LBNL — In this talk we will report optical studies on ultrathin MoS_2 layers through optical reflection, Raman scattering, and photoluminescence spectroscopy. Bulk MoS_2, a layered transition metal dichalcogenide, is an indirect bandgap semiconductor with negligible photoluminescence. Surprisingly, when the thickness of MoS_2 is reduced to a few unit cell thickness, a strong photoluminescence emerges. Further this photoluminescence increases with reduced MoS_2 layer thickness, although available materials amount is reduced. We will discuss possible mechanism that can give rise to this surprising photoluminescence behavior in MoS_2.

Liang Sun
Phys. Dept., UC Berkeley

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