
Università Politecnica delle Marche

Multiphysics Systems for Radio Frequency Electronics

# Simulations of Monolayer and Multilayer $MoS_2$ FET

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# 1 Introduction

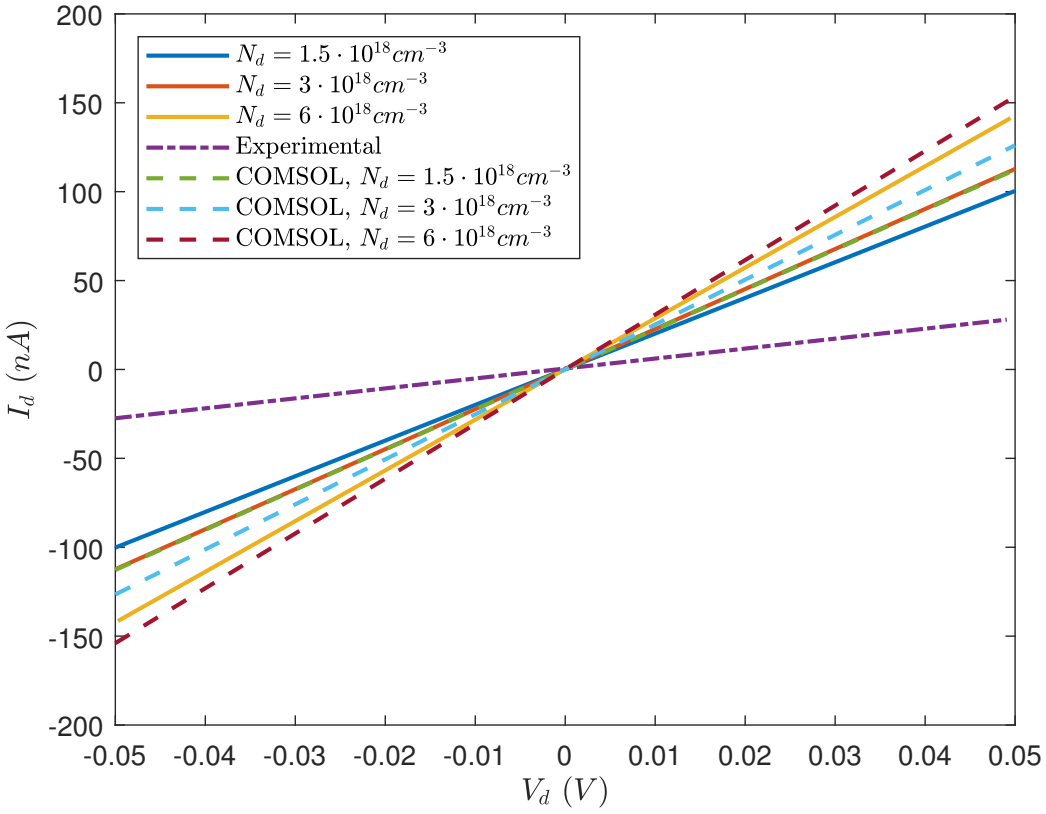


Figure 1: Monolayer $I_d(V_d)$

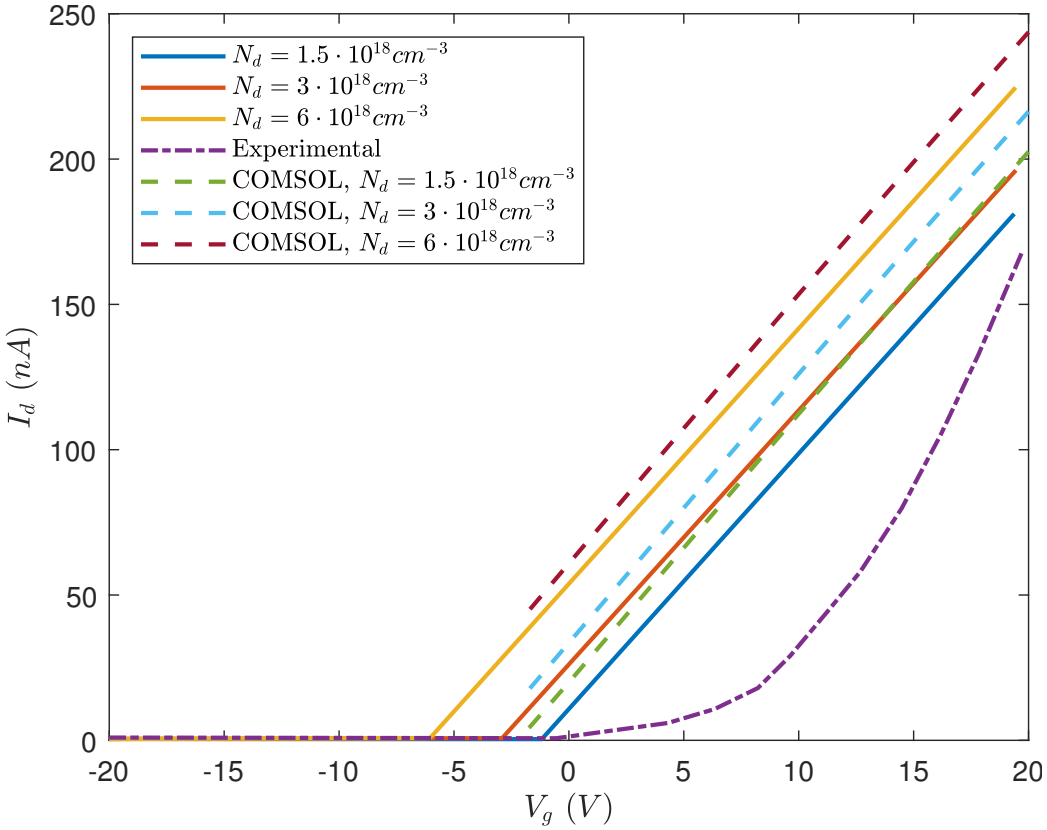


Figure 2: Monolayer $I_d(V_g)$

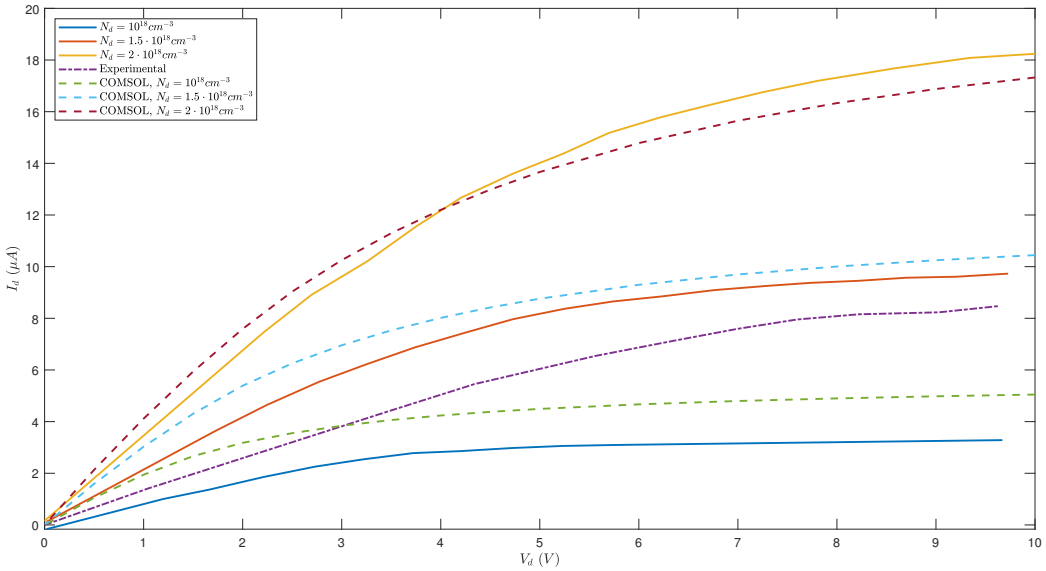


Figure 3: 4 layer $I_d(V_d)$

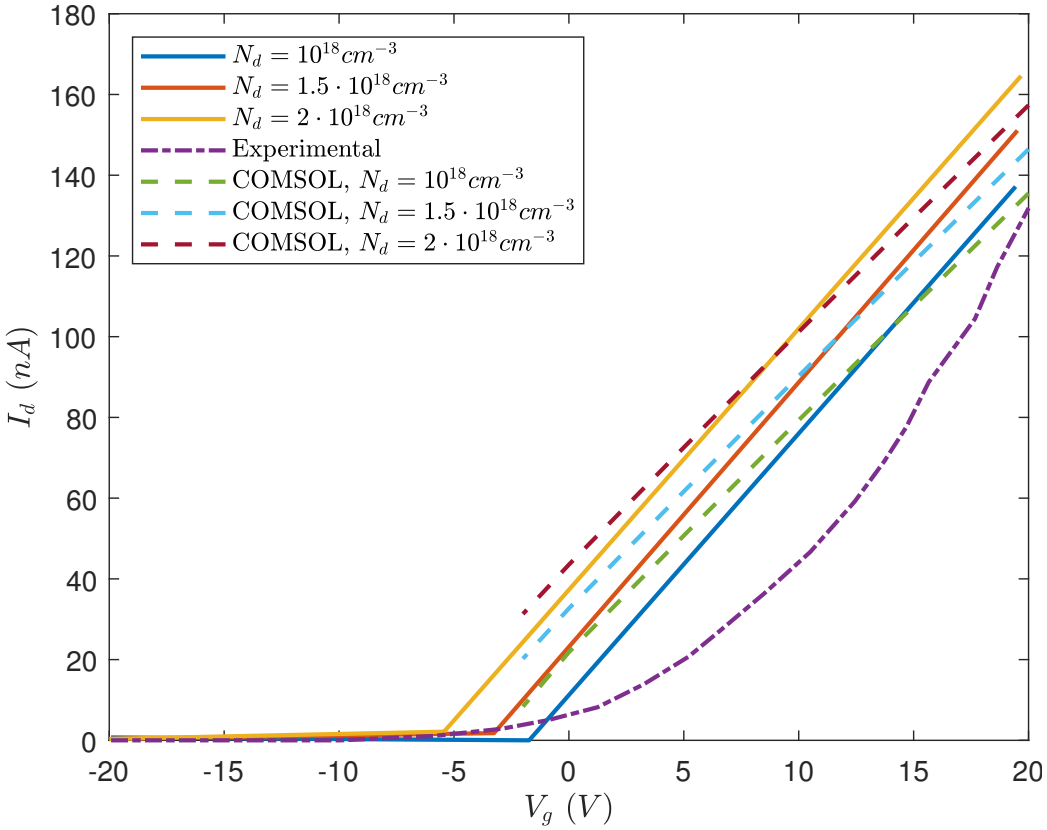


Figure 4: 4 layer $I_d(V_g)$

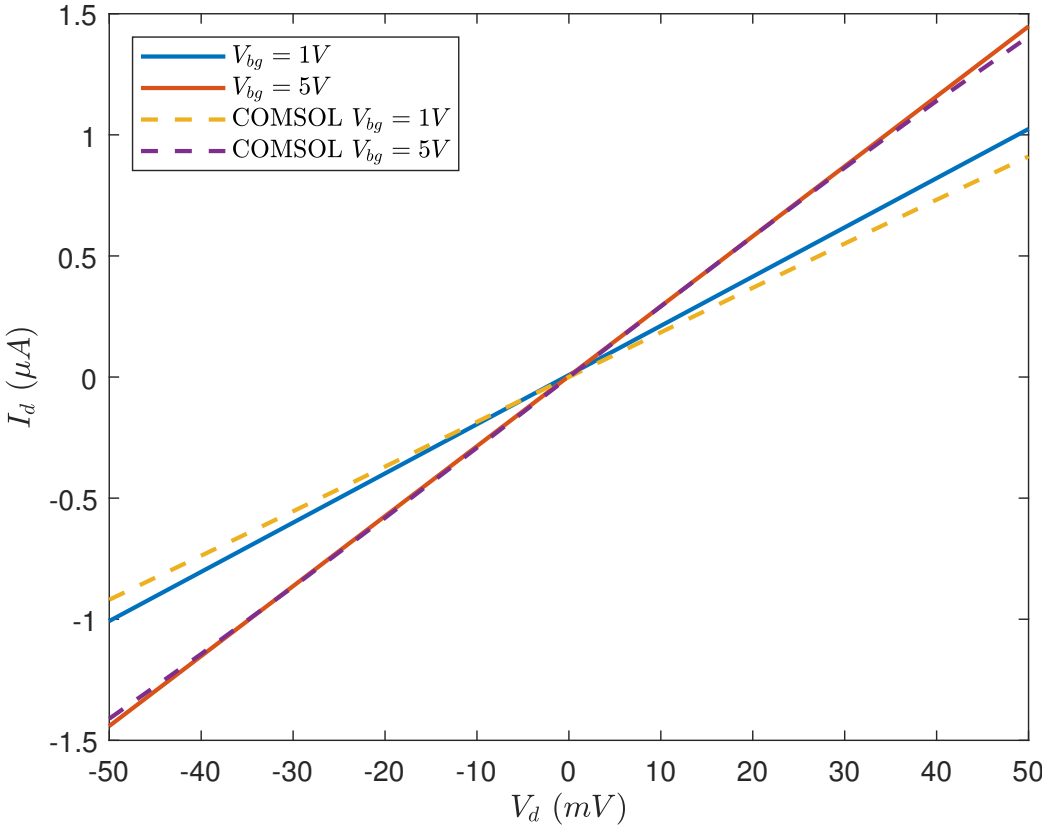


Figure 5: $I_d(V_d)$

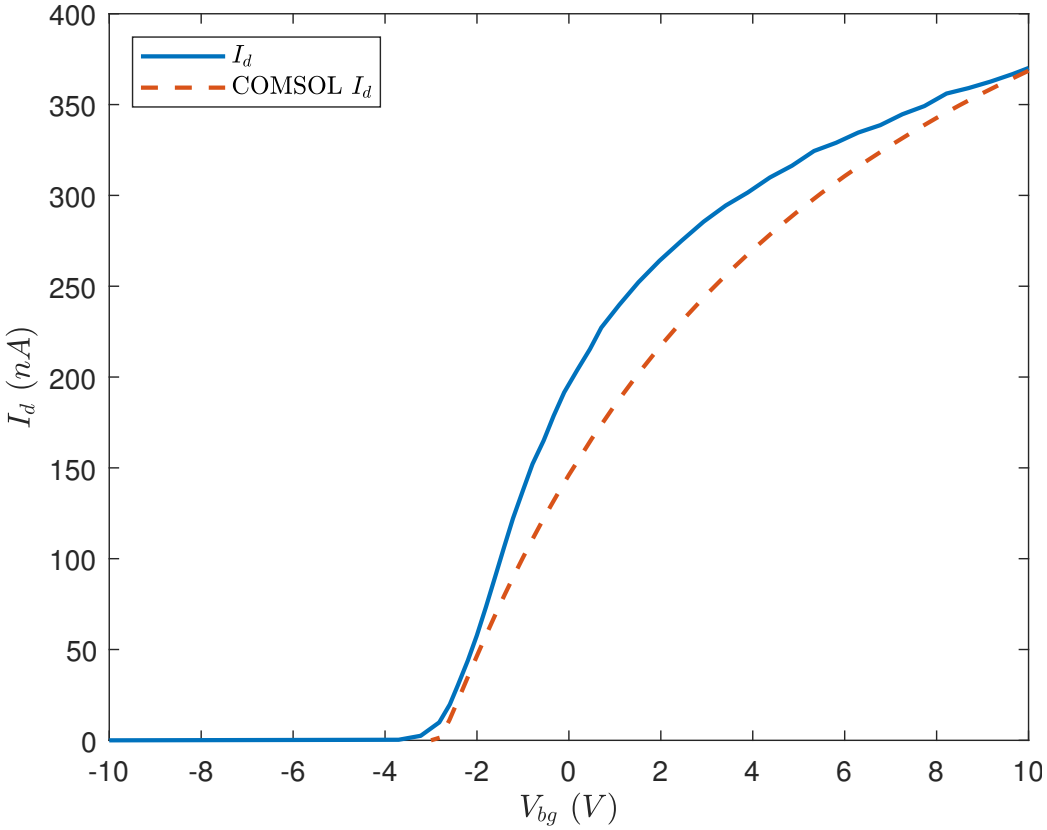


Figure 6: $I_d(V_{bg})$

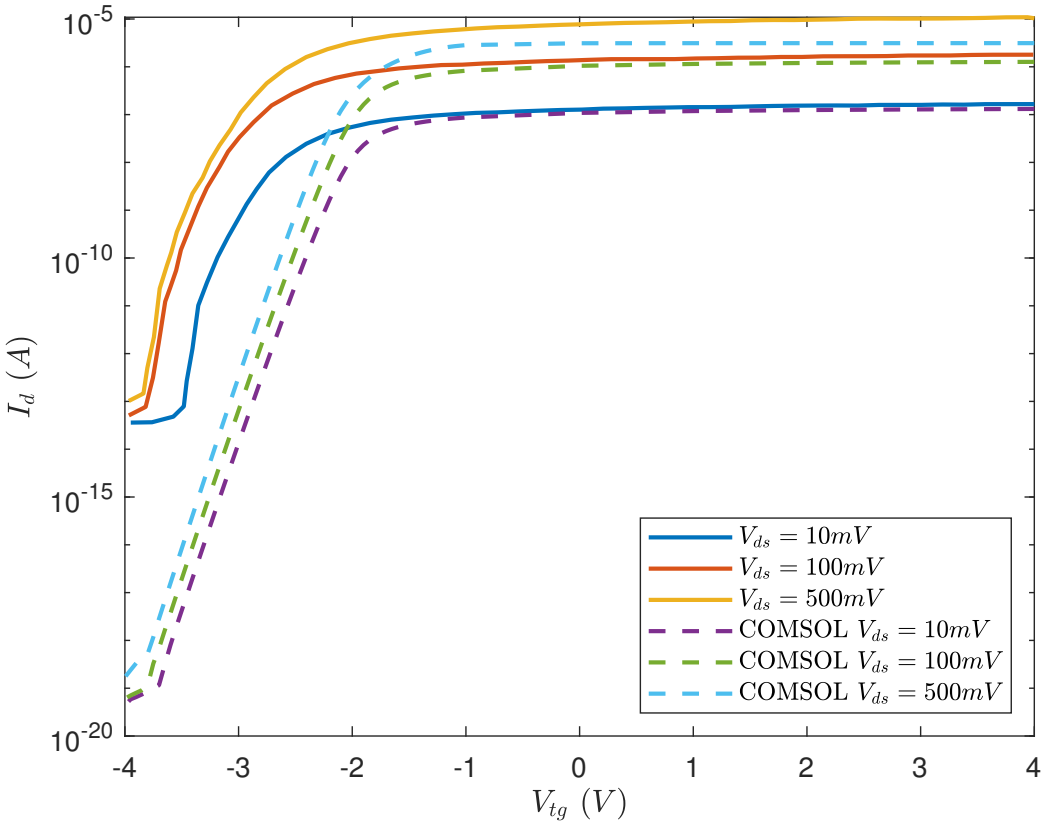


Figure 7: $I_d(V_{tg})$ varying $V_{ds}$

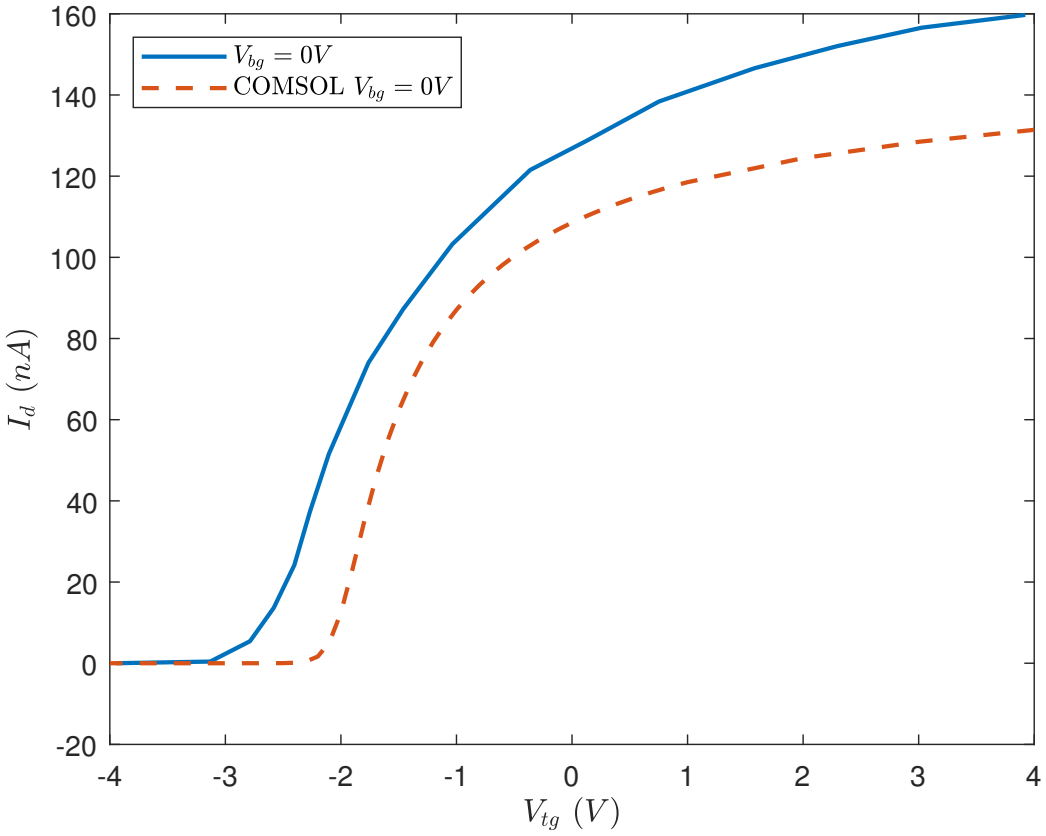


Figure 8: $I_d(V_{tg})$ varying $V_{bg}$

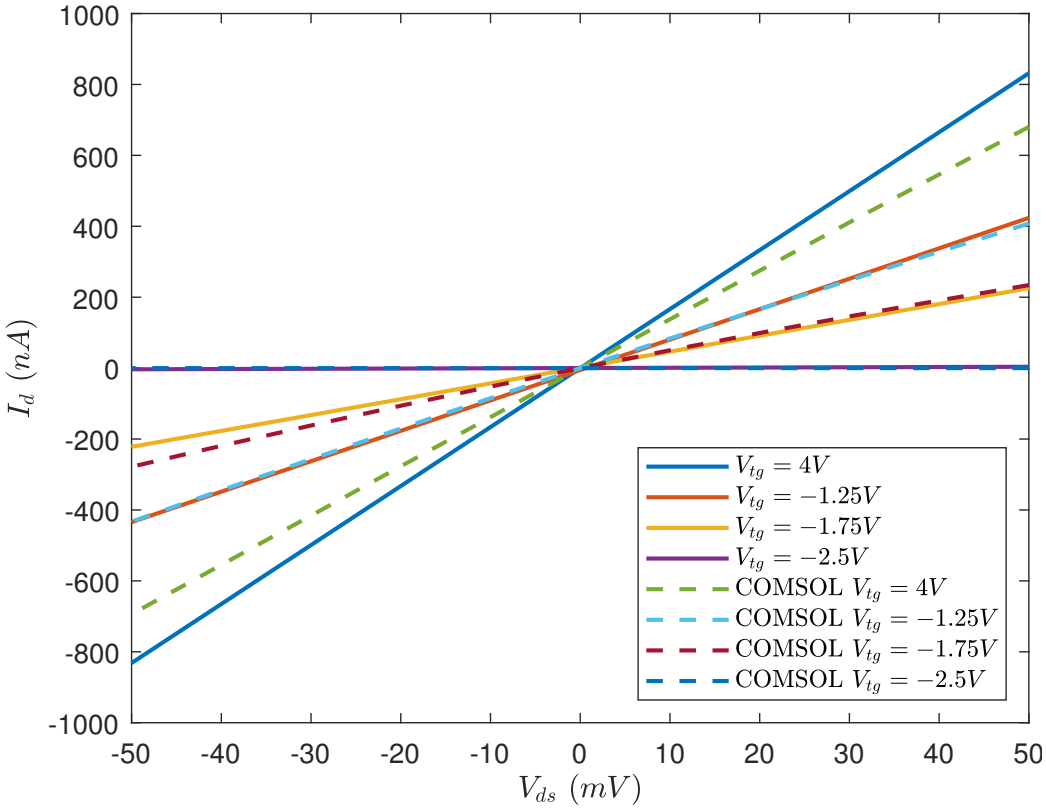


Figure 9: $I_d(V_{ds})$ varying $V_{tg}$

# References


[1] Sarah L. Howell, Deep Jariwala, Chung-Chiang Wu, Kan-Sheng Chen, Vinod K. Sangwan, Junmo Kang, Tobin J. Marks, Mark C. Hersam, and Lincoln J. Lauhon. "Investigation of Band-Offsets at Monolayer–Multilayer MoS2 Junctions by Scanning Photocurrent Microscopy". In: *Nano Letters* 15.4 (Apr. 2015). PMID: 25807012, pp. 2278–2284. DOI: 10.1021/nl504311p. URL: https://doi.org/10.1021/nl504311p.

[2] Branimir Radisavljevic, Aleksandra Radenovic, Jacopo Brivio, V. Giacometti, and Andras Kis. "Single-layer MoS2 transistors". In: *Nature Nanotechnology* 6.3 (Mar. 2011), pp. 147–150. ISSN: 1748-3395. DOI: 10.1038/nnano.2010.279. URL: https://doi.org/10.1038/nnano.2010.279.

[3] Chung-Chiang Wu, Deep Jariwala, Vinod K. Sangwan, Tobin J. Marks, Mark C. Hersam, and Lincoln J. Lauhon. "Elucidating the Photoresponse of Ultrathin MoS2 Field-Effect Transistors by Scanning Photocurrent Microscopy". In: *The Journal of Physical Chemistry Letters* 4.15 (2013), pp. 2508–2513. DOI: 10.1021/jz401199x. URL: https://doi.org/10.1021/jz401199x.