

Abstract Submitted
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Electron-Hole Asymmetry in WS_2 Revealed by Scanning Photocurrent Microscopy under Ionic-Liquid Gating NICOLAS UBRIG, DPMC, Université de Genève, CH-1211 Genève, Switzerland, SANGHYUN JO, DPMC and GAP, Université de Genève, CH-1211 Genève, Switzerland, HELMUTH BERGER, EPFL, CH-1015 Lausanne, Switzerland, ALBERTO F. MORPURGO, DPMC and GAP, Université de Genève, CH-1211 Genève, Switzerland, ALEXEY B. KUZMENKO, DPMC, Université de Genève, CH-1211 Genève, Switzerland — We perform scanning photocurrent microscopy on WS_2 -based ambipolar ionic liquid-gated field effect transistors with almost ideal transport characteristics. Both in the electron- and the hole-doping regimes, the photocurrent decays exponentially as a function of the distance between electrical contacts and the illumination spot, in agreement with a two-terminal Schottky-barrier device model. This allows us to compare the value and the doping dependence of the diffusion length of the minority electrons and holes on the same sample. Interestingly, the diffusion length of the minority electrons is several times larger than the one of the minority holes at the same doping concentration, which points to a strong intrinsic electron-hole asymmetry.

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