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**Transition-metal dichalcogenide-based dipolariton optoelectronic devices** GERMAN KOLMAKOV, NYC College of Technology, CUNY, TIM BYRNES, New York University, ANDY HE, ROMAN YA. KEZERASHVILI, NYC College of Technology, CUNY — Using computational modeling, we simulate the dynamics of dipolaritons in an optical microcavity, which encompasses the transition-metal dichalcogenide double-layer structure. We demonstrate that dipolaritons, a three-way superposition of photons, direct excitons and indirect excitons, are guided by a pattern deposited on the microcavity and can be driven by an external electric field or voltage applied to the structure. Focusing on a normal dipolariton gas in Y- and Psi-shaped patterns, we isolate conditions when the dipolariton flow can be switched between the channel branches of the pattern by the electric field. We also studied the superfluid dynamics of dipolariton Bose-Einstein condensates in patterned substrates at low temperatures, showing that the condensate in the channels can be accelerated and then directed by the electric field. We compare the obtained results with those for GaAs-based microcavities and demonstrate that dipolaritons in transition-metal dichalcogenide-based microcavities can be utilized for the design of optical switches and transistors for optoelectronic integrated circuits.

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