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Switching between hidden charge density wave phases in 1T-TaS_2[1] MICHAEL ALTVATER, GUOHONG LI, JAE WOOK KIM, SANG-WOOK CHEONG, EVA Y. ANDREI, Rutgers Univ — Recent experimental progress studying the multitude of correlated electronic properties of the layered material 1T-TaS_2 has revealed peculiar electronic phases which exist out of thermal equilibrium yet remain stable for surprisingly long time periods. TaS_2 is a 2D material that has attracted much attention due to its rich electronic spectrum exhibiting several charge density wave phases accessible through varying temperature as well as a low temperature superconducting phase at high pressure or extreme carrier doping. Applying voltage pulses across the sample at low temperatures suddenly switches the sample from an insulating commensurate-charge density wave state into a spectrum of thermally inaccessible metallic phases. These newly observed hidden phases hold promising device applications such as electronic oscillators, memristors, and Landau switches. In this work, we explore the electronic transport properties of 1T-TaS_2 in these hidden phases and the dynamics of switching between them using voltage pulses. This study provides insight into the microscopic details of these processes and motivates further investigation of such details.

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