

In this paper, we explore low-complexity transmission in physically-constrained massive multiple-input multiple-output (MIMO) systems by means of channel state information (CSI) relaxation. In particular, we propose a strategy to take advantage of the correlation experienced by the channels of neighbour antennas when deployed in tightly packed antenna arrays. The proposed scheme is based on collecting CSI for only a subset of antennas during the pilot training stage and, subsequently, using averages of the acquired CSI for the remaining closely-spaced antennas. By doing this, the total number of radio frequency (RF) chains, for both CSI acquisition and data transmission, and the baseband signal processing are reduced, hence simplifying the overall system operation. At the same time, this impacts the quality of the channel estimation produced after the CSI acquisition process. To characterize this tradeoff, we explore the impact that the number of antennas with instantaneous CSI has on the performance, signal processing complexity, and energy efficiency of time-division duplex (TDD) systems. The analytical and simulation results presented in this paper show that the application of the proposed strategy in size-constrained antenna arrays is able to significantly enhance the energy efficiency against systems with full CSI availability, while approximately preserving their average performance.