Tunnel magnetoresistance and cross-correlations in double quantum dot-Majorana wire system

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We theoretically investigate the spin and charge transport properties of double quantum dot system attached to distinct edges of the topological nanowire hosting Majorana zero-modes and weakly coupled to external ferromagnetic leads. The focus is put on the analysis of the current and tunnel magnetoresistance in a wide parameter space, while we specifically inspect the influence of spin canting angle characterizing the wavefunctions of the edge states.

Moreover, two protocols of dots' gate voltage detuning are examined. In the case of symmetric detuning, a noticeable current is present only in the narrow range of the parameters and flows in an uncorrelated manner between the drains. However, for the antisymmetric gate detuning there is an extensive regime where currents are considerable, while revealing strong, positive cross-correlations between two arms of the device associated with a highly correlated transport. The predicted transport features can be considered as further fingerprints of Majorana physics present in the system.