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Current driven magnetization dynamics in ferromagnetic nanowires with Dzyaloshinskii-Moriya interaction[1] OLEG TRETIAKOV, ARTEM ABANOV, Texas A&M University — We study a one-dimensional classical spin chain which models a long ferromagnetic wire with Dzyaloshinskii-Moriya interaction under the influence of an electric current. The static and dynamic properties of this system are investigated. We find a spiral state configuration of the magnetization in the wire for the static case as well as how it evolves for nonzero current. We also study propagation of a domain wall in such a wire. We obtain an analytical expression for the width of this domain wall as a function of the Dzyaloshinskii-Moriya interaction constant, uniaxial anisotropy along the wire, and exchange interaction constant. Our findings show that above a certain value of Dzyaloshinskii-Moriya constant a domain wall configuration cannot exist in the wire. Below this value we determine the domain wall dynamics for small currents, and as one of the results we calculate the drift velocity of the domain wall along the wire. Furthermore, we show that Dzyaloshinskii-Moriya interaction decreases the minimum value of current at which a domain wall starts to move.

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