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Atomistic simulations of domain wall dynamics in magnetic wires[1] MARIA STAMENOVA, School of Physics, Trinity College, Dublin, Ireland, TCHAVDAR TODOROV, School of Mathematics and Physics, Queen's University of Belfast, Belfast BT7 INN, UK, STEFANO SANVITO, School of Physics, Trinity College, Dublin, Ireland — The dynamical interplay between the conduction electrons and magnetization in mesoscopic magnetic structures generates interesting new physics. For instance, there is the possibility of a domain wall (DW) motion, driven by a spin-polarized electron flux. Here we address computationally the reverse phenomenon, namely, the generation of an electromotive force (emf) by the motion of a domain wall. We describe a one-dimensional magnetic wire within the *s-d* model, where conduction electrons are locally exchange coupled to classical magnetizations. For this closed quantum-classical spin-polarized system we have developed an Ehrenfest Molecular Dynamics simulation, which allows us to study the spatial and temporal evolution of any observables, characterizing the system. We have studied the motion of DWs in magnetic field as function of their thicknesses (ranging from the physical limit of one atomic spacing to two orders of magnitude thicker). For all of those we have systematically found charge redistribution along the wire, governed by the DW motion, which is a signiture of an emf.

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