Condensed Matter > Materials Science

Domain wall motion in ferromagnetic nanowires driven by arbitrary time-dependent fields: An exact result

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We address the dynamics of magnetic domain walls in ferromagnetic nanowires under the influence of external time-dependent magnetic fields. We report a new exact spatiotemporal solution of the Landau-Lifshitz-Gilbert equation for the case of soft ferromagnetic wires and nanostructures with uniaxial anisotropy. The solution holds for applied fields with arbitrary strength and time dependence. We further extend this solution to applied fields slowly varying in space and to multiple domain walls.

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