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Tunable spin-polarized terahertz excitations in graphene nanoribbons[1] JUN-QIANG LU, University of Puerto Rico, XIAOGUANG ZHANG, Oak Ridge National Laboratory, SOKRATE T. PANTELIDES, Vanderbilt University — Graphene nanoribbons have an energy gap that is tunable from zero to terahertz (THz) regime by an external gate field. The indirect energy gap in a nanoribbon of infinite length, however, is unsuitable for optical excitations. We report a theoretical investigation of such nanoribbons with a finite, nanoscale length. We show that such nanoribbons can be excited optically and exhibit unique electronic excitations in the THz regime. The results unveil THz radiation-induced edge standing spin waves with different wavelengths at the two edges and a resonant frequency that can be controlled by an external gate voltage, opening the possibility of THz "opto-spintronic" applications.

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