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Quantized beam shifts in graphene[1] WILTON KORT-KAMP, NIKOLAI SINITSYN, DIEGO DALVIT, Los Alamos National Laboratory — We show that the magneto-optical response of a graphene-on-substrate system in the presence of an external magnetic field strongly affects light beam shifts. In the quantum Hall regime, we predict quantized Imbert-Fedorov, Goos-Hänchen, and photonic spin Hall shifts. The Imbert-Fedorov and photonic spin Hall shifts are given in integer multiples of the fine structure constant α, while the Goos-Hänchen ones in discrete multiples of α^2. Due to time-reversal symmetry breaking the IF shifts change sign when the direction of the applied magnetic field is reversed, while the other shifts remain unchanged. We investigate the influence on these shifts of magnetic field, temperature, and material dispersion and dissipation. An experimental demonstration of quantized beam shifts could be achieved at terahertz frequencies for moderate values of the magnetic field.

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