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Electronic transport along graphene grain boundaries in quantizing magnetic fields[1] MADELEINE PHILLIPS, EUGENE MELE, University of Pennsylvania — We study ballistic electronic transport through grain boundaries in single layer graphene in the presence of a quantizing perpendicular magnetic field. For all the geometries studied, in addition to the chiral edge states on the sample boundaries, we find additional propagating electronic states confined to the grain boundary. When contacted to external electrodes, the current carried by the exterior edge states can be redirected into the grain boundary. Furthermore, edge state deflection leaves a signature in the shot noise: energies where quantum hall edge states are preserved correspond to a Fano factor of zero, while the Fano factor approaches one at energies where edge states are efficiently deflected into the grain boundary. We find that this switching can be selectively turned on or off by a uniform gate potential and study how the edge to grain boundary transmission is controlled by kinematic backscattering constraints in the grain boundary.

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