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Geometric dephasing-limited Hanle effect in long-distance lateral silicon spin transport devices BIQIN HUANG, HYUK-JAE JANG, University of Delaware, IAN APPELBAUM, University of Maryland — Using ballistic injection and hot-electron spin filter detection, lateral spin transport over 2 millimeters is demonstrated in undoped single-crystal Silicon. In these devices, geometrically-induced dephasing (Hanle effect) is so strong that the effects of spin precession could not be measured with only a single-axis magnetic field. However, a two-axis magnetic field can be used to obtain unequivocal evidence of spin precession and transport despite full dephasing. We therefore conclude that there is never a reason to avoid measurement of spin precession as unequivocal evidence of spin transport in semiconductor devices.

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