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Spintronics in high-quality graphene heterostructures via 1D contacts. VICTOR GUAROCHICO, JOSE SAMBRICIO, IRINA GRIGORIEVA, IVAN VERA, University of Manchester — We report the first observation of nonlocal pure spin currents in high-quality graphene channels that are fully encapsulated by hexagonal boron nitride (hBN) layers. Our heterostructure devices prevent residual contamination from the fabrication process, routinely allowing high-quality channels with mobilities up to 100000 cm^2/Vs. This architecture is enabled by creating spin injectors based on edge one-dimensional (1D) contacts[1], which avoid any significant charge doping from the contacts in the center of the channel. We present evidence for spin transport both at room and low temperatures. Spin injection through 1D contacts into uniform high-quality graphene gives us access to explore spintronics in the quantum transport regime, where we exploit quantum interference to enhance the nonlocal spin signals.

[1]Wang, L. et al. Science **2013**, 342 (6158), 614-617.

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