Abstract Submitted
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Non-local opto-electrical spin injection and detection in germanium at room temperature[1] MATTHIEU JAMET, FABIEN RORTAIS, CEA Grenoble, CARLO ZUCCHETTI, LAVINIA GHIRARDINI, ALBERTO FERRARI, Politecnico di Milano, CELINE VERGNAUD, JULIE WIDIEZ, ALAIN MARTY, JEAN-PHILIPPE ATTANE, CEA Grenoble, HENRI JAFFRES, JEAN-MARIE GEORGE, CNRS-Thales, MICHELE CELEBRANO, GIOVANNI ISELLA, FRANCO CICCACCI, MARCO FINAZZI, FEDERICO BOTTEGONI, Politecnico di Milano — Non-local charge carriers injection/detection schemes lie at the foundation of information manipulation in integrated systems. The next generation electronics may operate on the spin instead of the charge and germanium appears as the best hosting material to develop such spintronics for its compatibility with mainstream silicon technology and long spin lifetime at room temperature. Moreover, the energy proximity between the direct and indirect bandgaps allows for optical spin orientation. In this presentation, we demonstrate injection of pure spin currents in Ge, combined with non-local spin detection blocks at room temperature [F. Rortais et al., submitted to Nature Nanotechnology (2016)]. Spin injection is performed either electrically through a magnetic tunnel junction (MTJ) or optically, by using lithographed nanostructures to diffuse the light and create an in-plane polarized electron spin population. Pure spin current detection is achieved using either a MTJ or the inverse spin-Hall effect across a Pt stripe.

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