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Spin orbit coupling in graphene through gold intercalation¹ PAROMITA MUKHERJEE, EOIN O'FARRELL, JUN YOU TAN, YUTING YEO, G.K.W. KOON, BARBAROS ÖZYILMAZ, K. WATANABE, T. TANIGUCHI, National University of Singapore — Graphene has a very low value of spin orbit coupling. There have been several efforts to enhance the spin orbit interaction in graphene. Our previous work has provided clear evidence that spin orbit coupling can be induced in graphene through Rashba interaction with intercalated gold. By applying an additional electric field, this splitting can be increased or decreased depending on its relative direction with the internal electric field induced by gold in graphene. A large negative magnetoresistance due to an in-plane magnetic field has been observed which can be attributed to the fact that a magnetic moment is induced in gold due to spin-orbit coupling. Anomalous Hall Effect which decreases with an in-plane magnetic field further suggests the formation of a collective magnetic phase. We would like to further elaborate on the spin-orbit coupling in graphene using non local measurements. Hence, by intercalating graphene with gold, we can have a direct electric manipulation of the spin degrees of freedom and lead to its much awaited applications in spintronics, quantum computing.

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