Transport properties of semi-Dirac PIERRE ADROGUER, Laboratoire de physique, ENS de Lyon — Recent theoretical works show the existence of a new type of dispersion relation in both $\text{VO}_2/\text{TiO}_2$ nanostructures\textsuperscript{1} and in stressed graphene \textsuperscript{2}, where the electrons confined in a plane show a non-relativistic behavior along one direction, and relativistic in the other. This semi-Dirac dispersion $E = \sqrt{(v_F p_x)^2 + (p_y^2/2m)^2}$ can be observed in graphene when the Dirac cones of different valleys touch each other because of stress. When stress is increased, a gap is opened, and the graphene turns from a semi-metal to an insulator. We propose to address this topological phase transition through transport measurements.

\textsuperscript{1}V. Pardo and W.E. Pickett, Phys.Rev. Let. 102, 166803 (2009)  
\textsuperscript{2}G. Montambaux \textit{et al}., PRB 80, 153412 (2009)