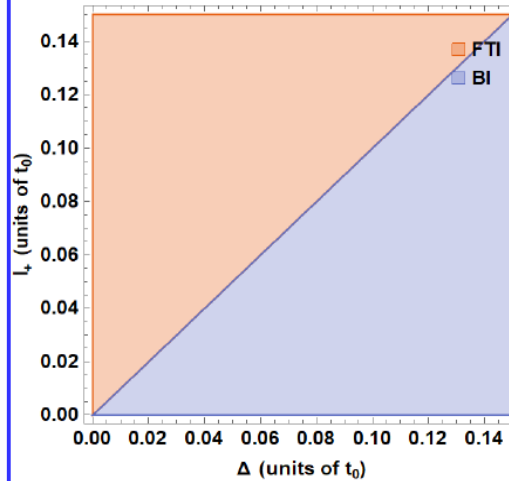
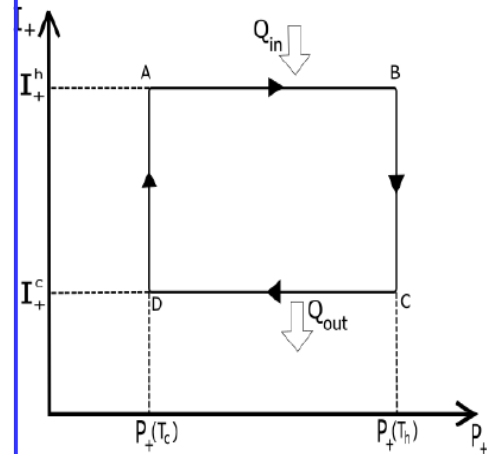


A thermodynamic probe of the topological phase transition in epitaxial graphene based Floquet topological insulator

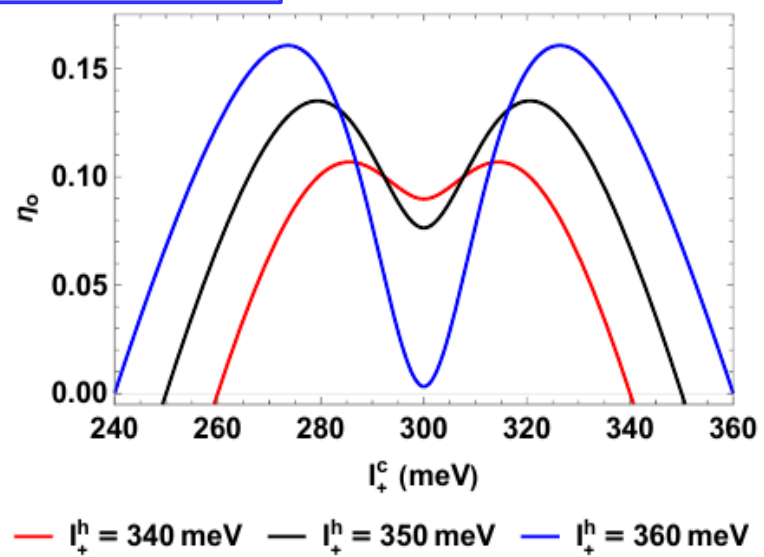
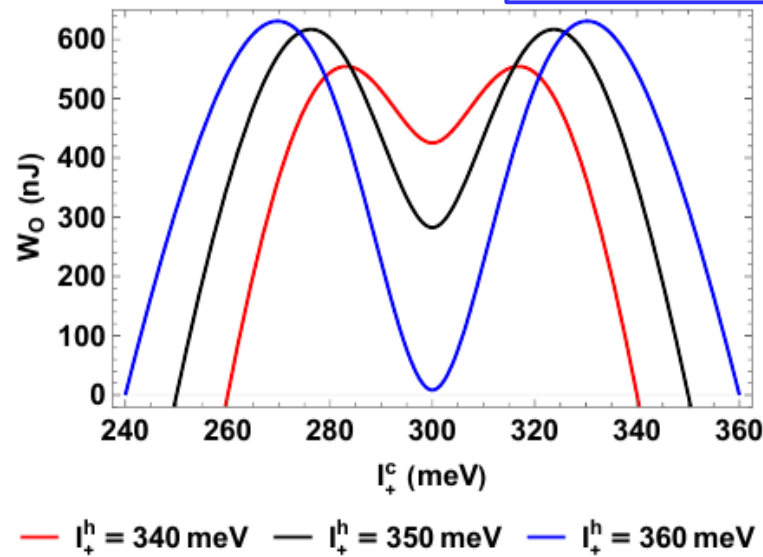
Topological phase diagram which distinguishes the FTI (orange) and band insulator (blue) (I_+ vs Δ). The boundary between them is the place where gap closes at K point. For left circularly polarized light the phase diagram remains same except I_+ is replaced by I_- . The plot shows that a threshold value of photo illumination parameter (I) is always present for all values of Δ where the topological phase change occurs.



The cycle of QOE has two isochoric and adiabatic processes from A → B, C → D and from B → C, C → D respectively. The heat energy input in the A → B stage is Q_{in} and Q_{out} is the heat energy output in the C → D stage. The hot and cold bath temperatures for the QOE cycle are set at T_h and T_c respectively. The illumination parameter and the occupation probabilities vary during the cycle.



Work output W_O (in units of nano Joule) and (b) Efficiency η_o of the QOE cycle are plotted versus I_+^c for three different values of $I_+^h = 340$ meV (red), 350 meV (black), and 360 meV (blue). The temperatures of the cold and hot bath are $T_c = 150$ K and $T_h = 300$ K both for (Left) and (Right).



— $I_+^h = 340$ meV — $I_+^h = 350$ meV — $I_+^h = 360$ meV — $I_+^h = 340$ meV — $I_+^h = 350$ meV — $I_+^h = 360$ meV

We have detected the photoinduced phase transition point in FTI using work and efficiency of QOE and QSE cycles. The work output and efficiency takes a two peak structure for QOE and is an extremum at the phase transition point. [arXiv:2012.02172](https://arxiv.org/abs/2012.02172), A. Kumar and C. Benjamin