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**Optical Properties of the  $\alpha$ - $T_3$  Model** EMILIA ILLES, University of Guelph, JULES CARBOTTE, McMaster University, ELISABETH NICOL, University of Guelph — The  $\alpha$ - $T_3$  model, recently introduced by Raoux et. al [1], provides a continuous evolution between the honeycomb lattice of graphene and the  $T_3$  or dice lattice. It is characterized by a variable Berry phase that changes continuously from  $\pi$  to 0. We present our calculations of optical properties of the  $\alpha$ - $T_3$  model, including the Hall quantization and optical conductivity, with an emphasis on the effect of the variable Berrys phase of the model. In particular, we describe the continuous evolution of the Hall quantization from a relativistic to a non-relativistic regime.

[1] A. Raoux, M. Morigi, J.-N. Fuchs, F. Piechon, and G. Montambaux, Phys. Rev. Lett. 112, 026402 (2014)

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