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Gate-Variable Optical Transitions in Graphene FENG WANG, UC Berkeley, YUANBO ZHANG, CHUANSHAN TIAN, CAGLAR GIRIT, ALEX ZETTL, MICHAEL CROMMIE, Y. RON SHEN — Two-dimensional graphene monolayers and bilayers exhibit fascinating electrical transport behaviors. Using infrared spectroscopy we find that they also have strong interband transitions and, remarkably, their optical transitions can be significantly modified through electrical gating. This unique gate-dependence of interband transitions adds a valuable dimension for optically probing graphene bandstructure. For a graphene monolayer, it yields directly the linear band dispersion of Dirac fermions, while in a bilayer it reveals a dominating van-Hove singularity arising from interlayer coupling.

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