Abstract Submitted
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Sensory Organ Like Response of Zigzag Edge Graphene Nanoribbons[1] VIJAY SHENOY, Indian Institute of Science Bangalore, SOMNATH BHOWMICK[2], Indian Institute of Science — Using a continuum Dirac theory, we study the density and spin response of zigzag edge terminated graphene ribbons subjected to edge potentials and Zeeman fields. Our analytical calculations of the density and spin responses of the closed system (fixed particle number) to the static edge fields, show a highly nonlinear Weber-Fechner type behavior where the response depends logarithmically on the edge potential. The dependence of the response on the size of the system (e.g. width of a nanoribbon) is also uncovered. Zigzag edge graphene nanoribbons, therefore, provide a realization of response of organs such as the eye and ear that obey Weber-Fechner law. We validate our analytical results with tight binding calculations. These results are crucial in understanding important effects of electron-electron interactions in graphene nanoribbons such as edge magnetism etc., and also suggest possibilities for device applications of graphene nanoribbons.
Reference: Somnath Bhowmick and Vijay B. Shenoy, *Physical Review B*, **82**. 155448 (2010)

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[2]Currently at Rice University

Vijay Shenoy
Indian Institute of Science Bangalore

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