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Impact of point defects in graphene systems MIGUEL MORENO UGEDA, ANTONIO MARTÍNEZ-GALERA, IVÁN BRIHUEGA, JOSÉ MARÍA GÓMEZ-RODRÍGUEZ, Departamento de Física de la Materia Condensada, Universidad Autónoma de Madrid, E-28049 Madrid, Spain — Topological defects strongly influence the mechanical, electronic and even magnetic properties of low dimensional carbon-based systems. Taking advantage of the key role of defects in these systems, a unique route based on defect engineering is being developed to broaden the functionalities of graphene. In particular, vacancy-type defects are of an extraordinary importance as they are the key ingredient to understand the new properties shown by functionalized graphene after irradiation. While the role played by these vacancies as single entities has been extensively addressed by theory, experimental data available only refer to statistical properties of the whole heterogeneous collection of vacancies generated in the irradiation process. Scanning tunneling microscopy has great potential in this arena since it enables characterization of point defects at the atomic level. In our work, we first created well characterized individual vacancies on graphene layers by Ar+ ion irradiation and then, using low temperature scanning tunneling microscopy/spectroscopy, we individually investigated the impact of each type of such vacancies on the electronic, structural and magnetic properties of several graphene systems [1-3]. [1] M. M. Ugeda, et al, Phys. Rev. Lett 104, 096804 (2010). [2] M. M. Ugeda, et al. Phys. Rev. Lett 107, 116803 (2011). [3] M. M. Ugeda, et al Phys. Rev B,85, 121402 (R) (2012).

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