Synchrotron Radiation Research in Material Science

Debora Pierucci

Alba Synchrotron Light Facility, CELLS,
Carrer de la llum 2-26, 08290, Cerdanyola del Vallès, Barcelona, Spain

ABSTRACT

The present talk would like to show my scientific career path starting with my master degree, passing by my PhD project until my actual position as beamline scientist at the Spain synchrotron facility ALBA. The importance of student mobility programs, like the ERASMUS program, will be discussed in the framework of scientific international perspectives.

Thanks to the different educational impulses that I received, I have been projected into my passionate adventure into the synchrotron network. Synchrotron radiation science plays a leading role in pure science and in emerging technology in particular concerning the study of new 2D materials like graphene[1]–[4].

This wonderful material, consists of only a one-atom thick plane of carbon atoms, is the strongest material in the world and can be used in a plethora of disciplines including energy technology, nanotechnology, biological engineering, electronics and more.

Synchrotrons offer a new way of investigating matter at molecular and atomic scale expanding the research horizon and the way how we are able to look inside the atomic-scale world.

REFERENCES

[1] D. Pierucci, H. Henck, Z. Ben Aziza, C. H. Naylor, A. Balan, J. E. Rault, M. G. Silly, Y. J. Dappe, F. Bertran, P. Le Fèvre, F. Sirotti, A. T. C. Johnson, and A. Ouerghi, "Tunable Doping in Hydrogenated Single Layered Molybdenum Disulfide," *ACS Nano*, vol. 11, no. 2, pp. 1755–1761, Feb. 2017.

[2] D. Pierucci, H. Henck, J. Avila, A. Balan, C. H. Naylor, G. Patriarche, Y. J. Dappe, M. G. Silly, F. Sirotti, A. T. C. Johnson, M. C. Asensio, and A. Ouerghi, "Band alignment and minigaps in monolayer MoS2-graphene van der Waals heterostructures," *Nano Lett.*, vol. 16, no. 7, pp. 4054–4061, 2016.

[3] D. Pierucci, H. Sediri, M. Hajlaoui, J. Girard, T. Brumme, M. Calandra, E. Velez-fort, G. Patriarche, M. G. Silly, G. Ferro, V. Soulière, M. Marangolo, F. Sirotti, F. Mauri, and A. Ouerghi, "Evidence for Flat Bands near the Fermi Level in Epitaxial Rhombohedral Multilayer Graphene," *ACS Nano*, vol. 9, no. 5, pp. 5432–5439, 2015.

[4] D. Pierucci, H. Sediri, M. Hajlaoui, E. Velez-Fort, Y. J. Dappe, M. G. Silly, R. Belkhou, A. Shukla, F. Sirotti, N. Gogneau, and A. Ouerghi, "Self-organized metal-semiconductor epitaxial graphene layer on off-axis 4H-SiC(0001)," *Nano Res.*, vol. 8, no. 3, pp. 1026–1037, Oct. 2015.