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Electronic properties of two-dimensional nanomaterials "beyond graphene"

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After the groundbreaking impact of graphene, the scientific community is actively exploring two-dimensional (2D) semiconductors —beyond graphene for their promising application capabilities, often complementary to those of graphene. Different classes of 2D semiconductors have emerged in recent years: transition-metal dichalcogenides (TMDs); monolayer black phosphorus; silicene/germanene; and IV-VI semiconductors. Many innovative applications, widely used in our daily lives, are based on the exploitation of collective properties of matter (ferromagnetism, superconductivity, the quantum Hall effect and plasmonic excitations). Therefore, the comprehension of collective electronic excitations is crucial in order to develop new disruptive technologies for health, telecommunications, energy etc. In particular, the novel field of plasmonics has recently emerged, in consideration of the progress of nanotechnology and nanofabrication. Then the talk will focus on understanding the electronic properties of Silicene and PtTe2 crucial to devise broadband photodetectors, ultraviolet-imaging applications, and plasmon devices.

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Biography

Francesca Alessandro obtained her master's degree in physics and PhD in science and engineering of the environmental, construction and energy at the university of calabria (Italy). In 2019, she worked in the lab of prof. D. Cazorla Amorós, university of alicante, Spain. Her primary research interests include plasmonics and 2D semiconductors.

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