

MSCA-IF Postdoctoral Fellowships

Graphene Nanoribbon based Field Effect Transistors

Postdoctoral fellows are invited to apply for a research position in nanofabrication and characterization of nanoelectronic devices to study the intrinsic properties of both individual and networks of atomically-precise graphene nanoribbons (GNR) grown by on-surface synthesis technique ([Science 360 \(2018\)](#) and [Adv. Mater. 34 \(2022\)](#)). Although GNR have promised theoretically high performance field effect transistors (FETs) due to their semiconducting properties, in 10 years only a couple of reports have achieved decent ON/OFF ratios of 4 order of magnitude. One reason behind such discrepancy is that the wet method commonly used to transfer the GNRs onto functional substrates is not effective in preserving their atomic structure, leading to poor performance FETs. Therefore, a deterministic dry transfer method is essential for preserving their atomically-precise structure, and for that one needs to decouple GNRs from the underlying catalytic substrate. As first approach, conventional techniques to transfer 2D materials will be adopted to build 2D heterostructures that preserve the intrinsic properties. However, more sophisticated methods such as the intercalation of self-assembled monolayers will be also considered to test their effectiveness.

The fellow will synthesize GNR-based nanomaterials, develop a dry method to transfer them onto target substrates, and measure the FET properties. The devices will be characterized not only electrically but also optically in a Raman and UV-Visible spectroscopy systems.

Strong background and experience in nanofabrication, electronic devices, and 2D materials is required. Python programming skills is also a bonus for data analysis. Applicants, are requested to have excellent oral and written English. Interested candidates will be requested to apply to a Marie Skłodowska-Curie Actions - Individual Fellowship (MSCA- IF) grant.

Interested applicants may request further information and send their CV and a brief statement of interests to Prof. Aitor Mugarza and Dr. Jose Ramon Duran at the e-mail addresses given below.

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