**Spin coater**, **hotplate**, **mask aligner**, **oxygen plasma etcher**, **sputtering machine,** **thermal evaporator**

**Equipment:** Clean room for optical lithography

**No. of Equipment: UFCH11**

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**Equipment Description**

Optical lithography fabrication

The clean room is equipped with a spin coater (LabSpin6, Süss), hotplate (Delta HP, Süss) and mask aligner (MJB4, Süss) for the lithography process, an oxygen plasma etcher (Pico, Diener) for cleaning and etching graphene, a sputtering machine (Q300TD, Quorum Technologies) and thermal evaporator (Oxford Instruments) for the deposition of metal layers. Complex structures with multiple lithographical steps combining the transfer and etching of several graphene layers with metal deposition are also feasible in the clean room.

**Specification of expertise relevant to NanoEnviCz workpackages:**

**WP3**c

**Detailed description of expertise**

**Please, specify the main research topics connected with equipment**:

Using optical lithography, a wide range of samples and devices can be prepared, depending on the specific requirements for the experiment. For example, graphene can be etched in an oxygen plasma into any required shape, and can be subsequently contacted with metallic contacts for electrical characterization, markers can be deposited on the substrate for the characterization of (exfoliated) graphene and other low dimensional materials [1].

**Please, specify the secondary research topics connected with equipment**:

Second, in the cleanroom also research is done to optimize the fabrication recipes for the fabrication of devices and new sample fabrication techniques are developed to fulfill the requirements of the devices that are used for the main research topics.

**Keywords describing research area:**

optical lithography, graphene patterning, graphene devices

**Competence**

**Relevance for applied and industrial research:**

**Relevance for fundamental studies:**

Preparation of low dimensional material devices for electrical and optical spectroscopical experiments using optical lithography. Complex structures consisting of low-dimensional materials metal and metal layers can be prepared by multiple step lithography.

**Comments**

Clean room laboratory is designed for the fabrication of small batches of devices for fundamental research only and not suited for the fabrication of large industrial size batches of devices.

**References**

[1] T. G. A. Verhagen, V. Vales, M. Kalbac, J. Vejpravova, *Phys. status solidi* **2015**, *252*, 2401.