



ISTITUTO ITALIANO  
DI TECNOLOGIA

## 1. Optical and electronic low-dimensional nanomaterial devices.

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We aim to develop new concepts for optoelectronic devices based on state-of-the-art nanomaterials. One interesting material class are low-dimensional semiconductor materials such as 2D layered perovskites. We target single nanostructures of such perovskites that will be investigated by time-resolved fluorescence spectroscopy, Raman spectroscopy, and electronic measurements. Then proof-of-concept device architectures will be developed for sensing, light emission, and signal processing. The PhD candidate will work on the functionalization of the nanostructures via surface chemistry, ion-exchange processes, and on lithography-based electrical contact fabrication. Additionally, the nanomaterials will be combined with optical or plasmonic cavities for enhanced light emission and light-matter coupling. The optoelectronic properties of the fabricated devices will be assessed towards LEDs, lasing, memristors and other applications.

Requirements: The ideal candidate should have a degree in materials science, physics, chemistry or engineering, with a strong interest in photophysics of nanomaterials and device fabrication.

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