

Layered 2D Materials Based THz Spectroscopy and Imaging

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RADESS The LAMARS project will focus on various THz devices based on graphene, other 2D layered materials and their heterostructures for THz spectroscopy and imaging. The availability of economically viable THz alternatives to the current expensive high-end components is generally considered as the prerequisite for the adaptation and development of new innovative applications in several emerging fields, such as security screening, bio-medical diagnostics and sensing. In the first phase, the project will focus on the optimization of the plasma-wave and field effect transistors based mixer-type THz detectors and related components for low-cost coherent detection. The feasibility and material requirements for passive radiometric imaging of room temperature targets will also be examined. New physics related to graphene and other 2D layered material based THz emitters will be investigated, with the final aim to develop a new generation of THz spectroscopy and imaging systems (e.g., biochemical THz spectroscopy). The project is a joint research initiative between VTT and Aalto University and has strong international collaboration network covering THz laboratories in Europe, Asia and North America.