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New frontiers for infrared

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Abstract:

Infrared (IR) science and technology has been mainly dedicated to surveillance and security: since the 70's specialized techniques have been emerging in thermal imaging for medical and cultural heritage diagnostics, building and aeronautics structures control, energy savings and remote sensing. Most of these applications were developed thanks to IR FPAs sensors with high numbers of pixels and, actually, working at room temperatures. Besides these technological achievements in sensors/ receivers, advanced developments of IR laser sources up to far IR bands have been achieved in the form QCL (quantum cascade laser), allowing wide band TLC and high sensitivity systems for security. recently new sensors and sources with improved performances are emerging in the very far IR region up to submillimeter wavelengths, the so called terahertz (THz) region. A survey of the historical growth and a forecast of the future developments in Devices and Systems for the new frontier of IR will be discussed, in particular for the key questions: "From where and when is IR coming?", "Where is it now?" and "Where will it go and when?". These questions will be treated for key systems (Military/Civil), key devices (Sensors/ Sources), and new strategic technologies (Nanotech/TeraHertz).