SPIE Defense + Security, Conference 10624
Infrared Technology and Applications XLIV
Sunday - Thursday 15 - 19 April 2018; Orlando Florida
Paper number: 10624-28

High Performance SWIR/MWIR and MWIR/MWIR Bispectral MCT Detectors by AIM

Heinrich Figgemeier, Christopher Ames, Johannes Beetz, Rainer Breiter, Detlef Eich, Stefan Hanna, Karl-Martin Mahlein, Timo Schallenberg, Jan Wenisch

AIM Infrarot-Module GmbH (Germany)

Abstract

Current development efforts in IR-module technology show two major trends: reduction in size, weight and power of IR-systems and further increase of system performance by introducing 3rd Gen IR-modules. Concerning 3rd Gen IR-modules AIM is developing SWIR/MWIR and MWIR/MWIR bispectral MCT detector making use of its established and qualified MBE technology based on the growth of MCT multi-layers on GaAs substrate.

The advantage of multispectral versus single color IR-sensors is the ability to combine sensitivity of two different IR wavelengths in one detector. This greatly enhances the ability to gather information from a scene, which is a significant additional benefit for IR-systems, as in seeker heads, missile warners or counter measures against laser-guided beam-rider weapons. In particular the combination of the SWIR/MWIR or MWIR/MWIR spectral bands promote an enhanced target discrimination and identification by increasing the identification range, by enabling the target acquisition in front of strongly structured backgrounds or of targets with low thermal signature.

The information of the SWIR spectral range, which detects mainly the reflected part of the spectrum, and the passive IR-detection in the MWIR spectral range, can be favorably combined for the data acquisition and subsequent image data processing in our bispectral approach due to its temporal and spatial coincidence of the scene image.

In this paper results will be presented of AIM's SWIR/MWIR as well as MWIR/MWIR bispectral MCT detectors with 320x256 pixel and a 30 µm pitch. The detectors demonstrate very low color cross-talk, an excellent NETD in conjunction with low defect densities.

Keywords: FPA, MCT, MBE, bispectral, SWIR/MWIR, MWIR/MWIR, dual color, dual band

Text Summary (100 Words)

To meet the market demands for 3rd Gen IR-modules for future seeker head or missile warner applications, AIM is developing SWIR/MWIR and MWIR/MWIR bispectral MCT detectors making use of its established and qualified MBE technology based on the growth of MCT multi-layers on GaAs substrate.

In this paper results will be presented of AIM's SWIR/MWIR as well as MWIR/MWIR bispectral MCT detectors with 320x256 pixel and a 30 µm pitch. The detector architecture features a temporal and spatial coincident data acquisition. The detectors demonstrate very low color cross talk, an excellent NETD in conjunction with low defect densities.