# COMPARISON OF THE RELATIVE MERITS OF THE 3-5 цш AND THE 8-12 цш WAVEBANDS USING DETECTED THERMAL CONTRAST

**S. M. Stewart[1]*, R. B. Johnson[2]**

1) School of Engineering, Nazarbayev University, Astana 01000) , Kazakhstan; *sean.stewart@nu.edu.kz; 2) Department of Physics, Chemistry and Mathematics, Alabama A & M University, Normal, Alabama, USA

Introduction. The two most important atmospheric transmission bands in the infrared occur at 3-5 ЦПП and 8-12 |лп respectively. For a given infrared detector a common question that continues to be asked is, of the two spectral bands, which, if any, gives the better performance? While seemly an innocent enough question, the literature attests it has not been without controversy. Here many conflicting and often contradictory results can be found. In this work an analysis designed to assess the relative merits of infrared detectors operating in the 3-5 ЦШ and 8-12 ЦШ spectral bands based on the recently defined figure of merit known as the detected thermal contrast [1] is undertaken.

Methodology. A theoretical comparison between the two wavebands employing the recently defined detected thermal contrast as the thermal figure of merit was made.

Results and discussion. Under ideal limiting conditions typical of those found for many industrial and scientific applications, from a consideration of targets whose spectral emissivities vary as a function of both wavelength and temperature, exact expressions for the detected thermal contrast based on the recently introduced polylogarithmic formulation of the problem [2] are developed for both thermal and quantum detectors. It is found the 3-5 ЦШ waveband for either detector type gives better performance for a range of different target types whose spectral emissivities are well known while differences between detector type is not as significant as previously thought to be [3]. The work not only extends a number of approximation schemes that have been proposed and developed in the past [4], it also challenges a number of previously reported results [5,6].

Conclusions. When detected thermal contrast is used as the thermal figure of merit the 3-5 цш waveband is found to give the better performance for both thermal and quantum detectors.

References.

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