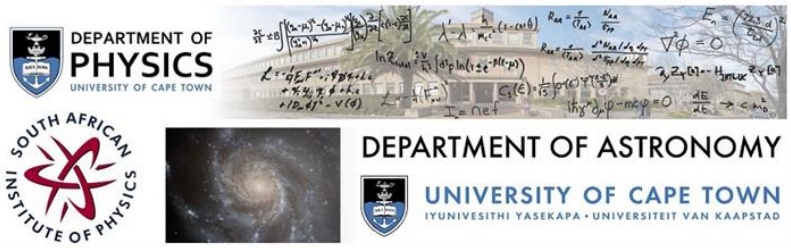
SAIP2016



Contribution ID : 3

Problems with the calculation of the refractive index of $In_xGa_{1-x}As$

Tuesday 05 Jul 2016 at 16:10 (01h50')

Abstract :

$In_xGa_{1-x}As$ is a binary alloy used in advanced optoelectronic devices such as laser diodes, photodetectors and optical modulators. The material also finds application in infrared optical fibre communications, since the optical band gap spans wavelengths required for this mode of communication. Consequently a knowledge of the refractive index n is required in order to model the optical properties of the alloy. The refractive index of a material is a function not only of the operating temperature, but also of the wavelength as well as the composition x in the case of an alloy.A literature search has revealed several theoretical models to calculate the refractive index of InxGa1-xAs. Theoretical formulas are based on: a single oscillator model, a modified oscillator model, the Sellmeier type equation and the dielectric function. Quantities that are required to be calculate include the energy Eo of the oscillator, the dispersion energy Ed and the band gap Eg (which depends on the compostion x).Upon assessing the models, some problems were encountered related to the interpretation of the composition x, and with scientific notation. An unwary researcher may thus inadvertently calculate incorrect values for the refractive index. Results obtained from the various models will be presented to highlight the problems encountered in this investigation.

Award :
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N/A

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Yes

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