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## Optical properties of a triple AlGaAs/GaAs quantum well purported for quantum cascade laser active region

By: Bahar, MK (Bahar, M. K.) <sup>[1]</sup>; Rodriguez-Magdaleno, KA (Rodriguez-Magdaleno, K. A.) <sup>[2]</sup>; Martinez-Orozco, JC (Martinez-Orozco, J. C.) <sup>[2]</sup>; Mora-Ramos, ME (Mora-Ramos, M. E.) <sup>[3]</sup>; Ugan, F (Ugan, F.) <sup>[4]</sup>

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### Abstract

A theoretical investigation on the conduction electron states in a triple inverse parabolic AlGaAs/GaAs quantum well, designed in the spirit of the active region for a quantum cascade laser, is performed. The study includes the influence of externally applied static electric and magnetic fields. The energy values and corresponding eigenfunctions are determined with the use of the effective mass approximation within the parabolic band description. The information on the allowed states is, then, used to evaluate some coefficients that represent the intraband nonlinear optical response of the structure. Numerical results are presented for the optical absorption and relative refractive index change coefficients as well as for those of nonlinear optical rectification and second harmonic generation. It is discussed that, in general, the amplitude and position of resonant peaks in the calculated quantities can be noticeably affected by the variation in the strength of the applied probe fields. Accordingly, the features of the investigated properties could suitably determine the application of this kind of structures for device proposals, as long as they can affect lasing regime in them.

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- ▼ Univ Autonoma Zacatecas, Unidad Acad Fis, Calzada Solidaridad Esquina Con Paseo Bufa S-N, Zacatecas 98060, Zac, Mexico

**Addresses:**

- ▼ <sup>1</sup> Sivas Cumhuriyet Univ, Dept Phys, Fac Sci, Sivas, Turkey
- ▼ <sup>2</sup> Univ Autonoma Zacatecas, Unidad Acad Fis, Calzada Solidaridad Esquina Con Paseo Bufa S-N, Zacatecas 98060, Zac, Mexico
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- ▼ <sup>4</sup> Sivas Cumhuriyet Univ, Fac Technol, Dept Opt Engn, Sivas, Turkey

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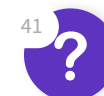
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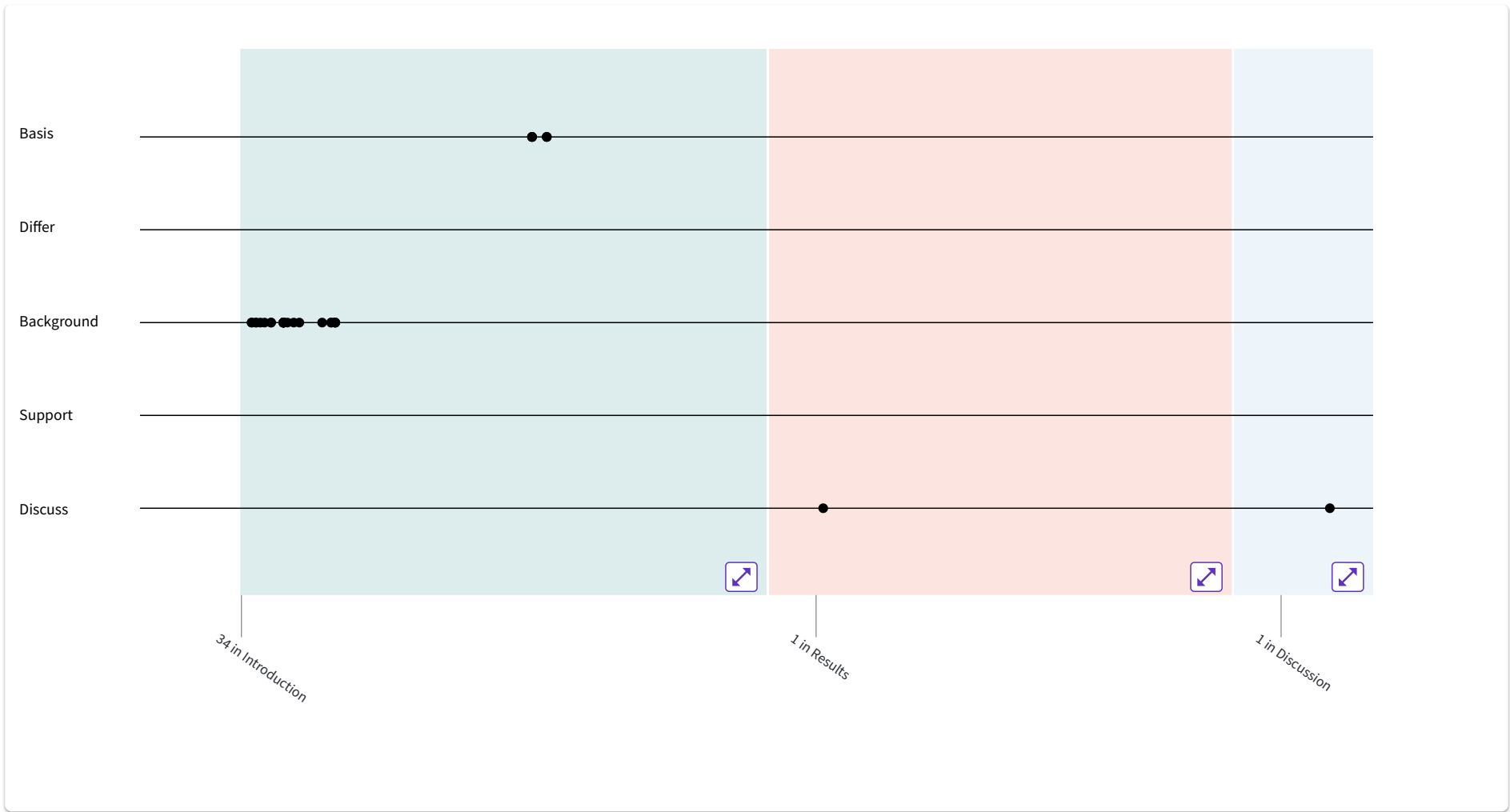
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