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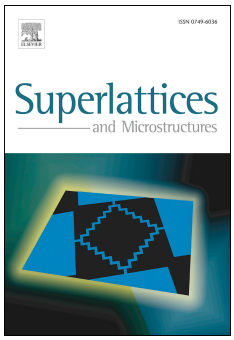


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# Bosonic Cascades of Indirect Excitons

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**Abstract**

Recently, the concept of the terahertz bosonic cascade laser (BCL) based on a parabolic quantum well (PQW) embedded in a microcavity was proposed. We refine this proposal by suggesting transitions between indirect exciton (IX) states as a source of terahertz emission. We explicitly propose a structure containing a narrow-square QW and a wide-parabolic QW for the realisation of a bosonic cascade. Advantages of this type of structures are in large dipole matrix elements for terahertz transitions and in long exciton radiative lifetimes which are crucial for realisation of threshold and quantum efficiency BCLs.

*Keywords:* bosonic cascade laser, indirect excitons, terahertz laser

## 1. Introduction

The concept of quantum cascade laser (QCL) was proposed in 1971 by Kazarinov and Suris [1]. They demonstrated that an electromagnetic field