Dokumenttyp: Zeitschriftenaufsatz

Autor(en) des Beitrags: Jirauschek, C.

Titel des Beitrags: Universal Quasi-Level Parameter for the Characterization of Laser Operation

Abstract: Impact Statement: The classification of lasers in three- or four-level schemes is of fundamental importance for describing their operational characteristics. From solid state and fiber lasers, it is well known that the observed characteristics does not coincide with the number of physical levels, and typically even intermediate behavior is observed, which can be described by a continuous quasi-level parameter. Here we generalize the quasi-level concept so that it can be applied to a wide range of laser media. Abstract: A parameter is proposed which classifies the laser operating characteristics according to the quasi-level terminology, i.e., as intermediate behavior between that of an ideal two- and three-level or three- and four-level laser scheme. Since the quasi-level parameter is purely based on a generic rate equation description of the laser, no inherent assumptions about gain medium properties or the pumping process are required. The validity of the quasi-level parameter is verified for various prototypical laser schemes. As a specific example of a nonideal laser, the operating behavior of an experimental quantum cascade laser is classified, which constitutes a quite generic laser type since the active region properties can be custom-engineered by quantum design.

Stichworte: Lasers, laser theory, quantum cascade lasers

Jahr: 2018

Jahr / Monat: 2018-08

Quartal: 3. Quartal

Monat: Aug

Seiten: 1-9

Sprache: en

Volltext / DOI: http://doi.org/10.1109/JPHOT.2018.2863025


Verlag / Institution: IEEE Xplore Digital Library

Print-ISSN: 1943-0647 1503209

E-ISSN: 1943-0655

Occurences: Einrichtungen > Fakultäten > Fakultät für Elektrotechnik und Informationstechnik > Lehrstühle und Professuren > Computational Photonics (Prof. Jirauschek) > 2018

entries: