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Leaky Modes on Side Pump Couplers for High Power Fiber Lasers

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Abstract

Theoretical and experimental studies used to demonstrate how leaky modes excitation increment can improve considerably the efficiency of side pump couplers for high power fiber laser will be presented here. It is important to mention that the scaling of the modern fiber lasers depends largely on the efficiency of the pump couplers. The side pumping technique for coupling power from diodes to the double cladding fiber (receiver fiber) in side pump couplers has been largely studied in the last decade. Several works have been dedicated to understand the principle of the power coupling on these devices and actually many techniques for the fabrication of the side couplers have been proposed. In this work it is presented a fabrication technique based on special low refractive index multimode fibers, which ensures an increment on the excitation of leaky modes. Taking advantage of this effect it is possible to obtain compact and robust devices. In fact, the technique allows to develop devices with a length three times less than commercial ones. Therefore, the theoretical and experimental results demonstrate that our technique represents a powerful skill to obtain optimum side pump couplers. It is important to highlight that the theoretical model presented here is based on Ray Theory and at this moment there is no any similar model reported in the world bibliography. Finally, the principal advantages of the technique are the repetitiveness and the low cost of fabrication of the side pump couplers using a glass processor (laser CO2), which represents a great advantage for scaling high power fiber lasers.

Biography:

Kenia Madrazo de la Rosa has completed her PhD at the age of 33 years from Center of Optical Investigations, A.C of Leon, Guanajuato, Mexico. Her principal areas of interest are: high power fiber laser devices, fiber sensors and laser spectroscopy. She has published 5 papers in reputed journals. At this moment, she is developing different theoretical and experimental studies related to the different measures resources of laser in different with the explotation of Leaky Modes in devices like sensors and side pump couplers. In the case of the last devices, the recent results have proven that by exploting the excitation of the Leaky Modes it is possible to obtain compact and robust side pump couplers for high power fiber lasers.

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