

A TOLERANT AND EFFICIENT LASER DIODE TO SINGLE MODE FIBER COUPLING SCHEME

Fadhali M, Saktioto. Zainal J, Munajat Y, Jalil A, and Rahman R

Institute of advanced Photonic Sciences, Faculty of Science

Universiti Teknologi Malaysia, Johor, Malaysia

mohamedfadhali@yahoo.com

Abstract:

In this paper we present the result of investigations and analysis of various parameters that contribute to the increased coupling efficiency between a laser diode and a single mode fiber coupling using ball lenses coupling scheme. The process of attachment of single mode fiber to the laser diode and welding of various coupling components, such as lens holders, fiber ferrule and welding clips have been performed in the so-called active alignment process, where the system measures the coupled power continuously during the process of coupling and welding the coupling components to each others and to the main substrate in their holder. Dual beams Nd:YAG laser welding system was used for the alignment and welding of the coupling components is a butterfly configuration. The experimentally measured coupling efficiency using doubled ball lenses coupling scheme was found to be around 75% with relaxed axial, lateral and angular misalignment tolerances. The mode fields of laser diode and single mode fiber have been found to be effectively matched at some optimum positions during the alignment process of the proposed coupling scheme which is sensitively dependent on the distance between the two ball lenses.