

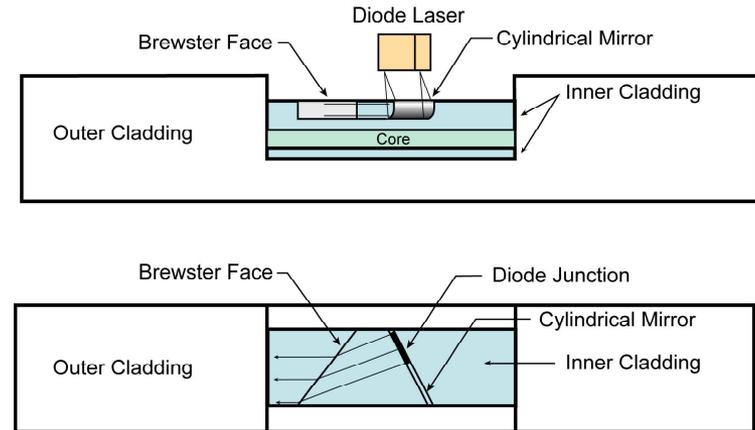
Highly Efficient Fiber Lasers for Wireless Power Transmission

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Proposal No: X2.03 - 9461

Identification and Significance of Innovation

- Basic technology is ytterbium-doped (Yb) fiber lasers with an electrical-to-optical efficiency of nominally 64% for application to wireless power transmission
- Utilizes, high-efficiency pump diodes now under development at several companies under DARPA support
- Innovation provided by this project would be a simple, robust and highly efficient means of coupling diode lasers to Yb fiber lasers by using laser micromachining to form an integral mirror and Brewster input port on the Yb fiber.



Technical Objectives

1. Further analyze the integral mirror/Brewster input port concept
2. Work with DARPA program participants to ensure that the coupling technique is compatible with high-efficiency diodes
3. Determine which Yb fiber structures are best suited to this application

Work Plan

Seven tasks to be carried out at the Q-Peak facility:

1. Further analyze the concept and develop a specific design for testing
2. Procure fiber and fabricate samples for testing
3. Evaluate the results obtained with laser micromachining fabrication
4. Investigate means of applying a suitable HR coating
5. Monitor progress on diode efficiency improvements
6. Monitor progress on Yb-fiber technology
7. Technical Reports and Phase II planning

NASA Applications

NASA paths for wireless power transmission include: Solar panels located in earth orbit down to earth, Earth to satellites for longer operational lifetime of orbiting vehicles, to dark regions of the moon to power exploration, from a space-based power station to other space-based vehicles

Non-NASA Applications

Wireless power transmission could be applied anywhere that it is impractical to run conventional land lines and the benefits of powering the remote location justify the cost of the installation. Military applications include remotely powering small, unmanned aircraft, remotely powering high-altitude, long-endurance aircraft

Firm Contacts

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