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(54) Title: MODAL INSTABILITY CONTROL IN FIBER LASERS

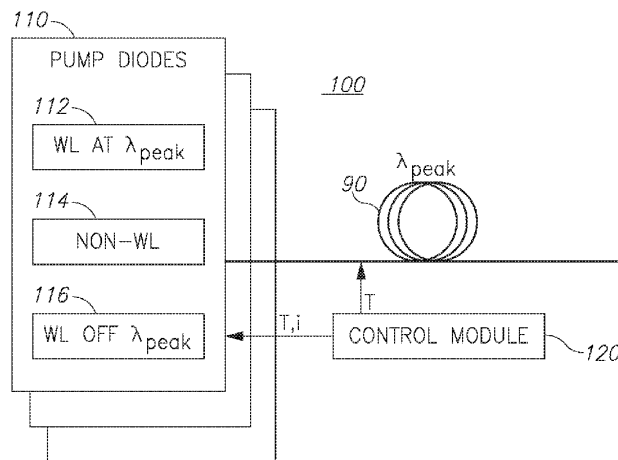


Figure 3

(57) **Abstract:** Fiber lasers and methods are provided, in which the modal instability threshold is raised to provide more laser power. Fiber lasers comprise an active optical fiber having at least one absorption peak wavelength (λ_{peak}) and capable of supporting more than a fundamental mode during operation, and a plurality of pump diodes connected to deliver radiation emitted thereby into the optical fiber. At least one of the pump diodes is a wavelength-locked (WL) diode and at least one of the pump diodes is configured to deliver radiation at at least $\lambda \neq \lambda_{\text{peak}}$ (not necessarily the same diode(s)). The pump diodes may comprise any of WL diode(s) at $\lambda \neq \lambda_{\text{peak}}$, WL diode(s) at $\lambda = \lambda_{\text{peak}}$ and non-WL diode(s). Pumping radiation off the fiber's absorption peak increases the modal instability threshold, most likely by reducing the temperature gradient in the active fiber at the fiber pump entrance point and along the fiber.

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