

# Re: temperature measurement of optical fiber

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- *From:* AES <[siegman@xxxxxxxxxxxx](mailto:siegman@xxxxxxxxxxxx)>
  - *Date:* Tue, 30 Dec 2008 18:06:08 -0800
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In article

<75114687-0b1a-4c35-8a85-9782e0d1c919@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, laser <[gcsel@xxxxxxxx](mailto:gcsel@xxxxxxxx)> wrote:

I am trying to measure the temperature of EDFA while it is operating. I couldn;t find EDFA's spectral information near 5-12um which is operating range of thermal camera that i have. Actually I am getting 60C reading from camera and 30C reading from thermocouple. It is a quite big.

I have no practical experience with this problem, but it sure seems like some kind of optical measurement would be attractive -- and could potentially be done "in vivo" (i.e., on the fiber while in operation) and/or using light going through the fiber.

- 1) There's surely a large change with temperature in the phase shift through the fiber. Make the fiber one arm of an interferometer; send a probe signal through; count fringes as temp goes up and down?
- 2) The linewidths and the fluorescent decay times of rare earth ions in glass change measurably with temp. EDFAs are full of REs. Monitor some transition in one of them -- maybe one of the laser transitions (with signal temporarily switched off), or an unrelated transition in the Er spectrum -- looking along the fiber, or at it from the side.
- 3) The broad fluorescent spectrum of the Er laser transition in particular surely changes in shape somewhat with temp. Pick three or four particularly sensitive wavelengths, monitor them (have to establish an initial calibration, of course).

Just seems as if there has to be some optical indicator you can calibrate and use for determining the fiber temp -- and doing so where it counts, inside the fiber.

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