

## Coherent Challenge Problem Statement

Jen: How is that active fiber efficiency test bench project going? Did you resolve the issues with the customer?

Rich: Not yet. The problem is that our testing is giving results around 20% higher than the customer's. Clearly we're not measuring the same thing.

Jen: What's your bench configuration now?

Rich: We use a 915 nm pump laser and a free space launch system to get the light into the coil of active fiber. This excites the ytterbium atoms in the fiber's core and produces the laser power. We ramp up the current to the pump laser in 15 steps from 9 amps to 23 amps.

For each current level we let the fiber lase and measure the all light that comes out. We put a 915 nm filter in front of the meter so we're just measuring laser power, not pump power.

Jen: There's enough reflection at the ends of the fiber to make a laser cavity?

Rich: Yup, about 3 percent at each end of the fiber. We're using Fresnel reflection and letting the fiber lase on its own.

Jen: How do you measure the pump power?

Rich: We cut back the fiber to about 10 cm and measure the pump power. We assume the fiber is too short to allow much lasing so we can ignore that.

Jen: So in the end you have laser power and pump power at 15 different values of the pump current.

Rich: Right. We can find the slope efficiency by plotting laser power versus pump power. But the customer said their measurements weren't even close to ours.

Jen: Have you been able to determine what the customer is doing differently?

Rich: As far as I can tell, they aren't measuring all the laser light that's produced, just the light at 1070 nm. And they must be measuring only the core power, not any laser power in the cladding.