

Defense Advanced Research Projects Agency



Fiber-coupled microsphere lasers

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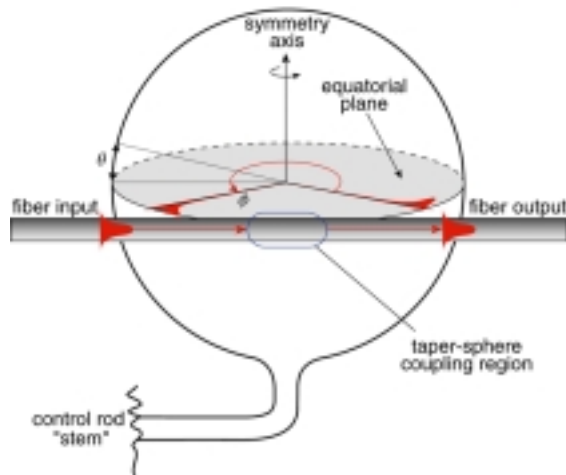
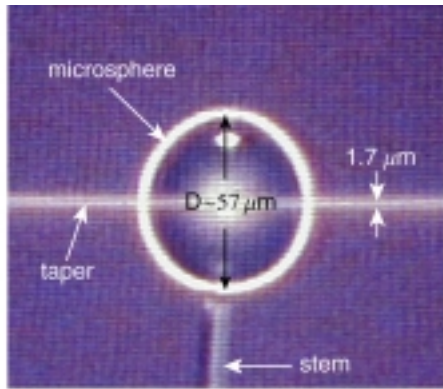
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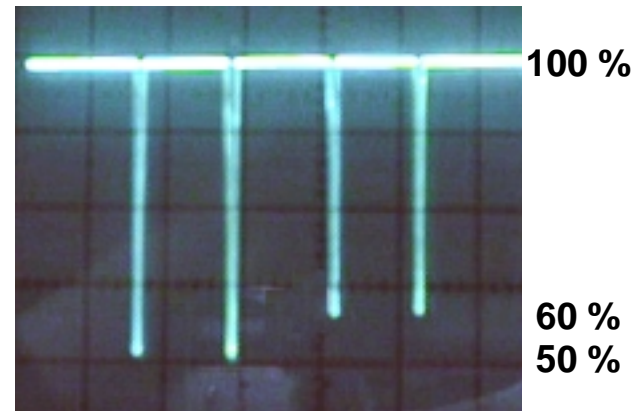
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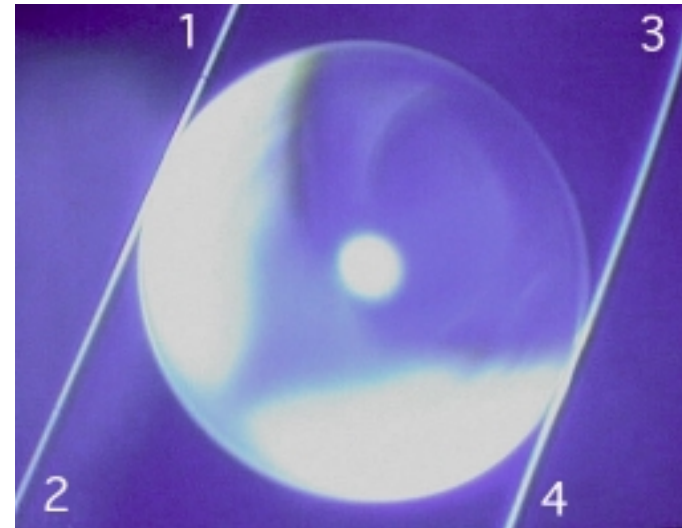
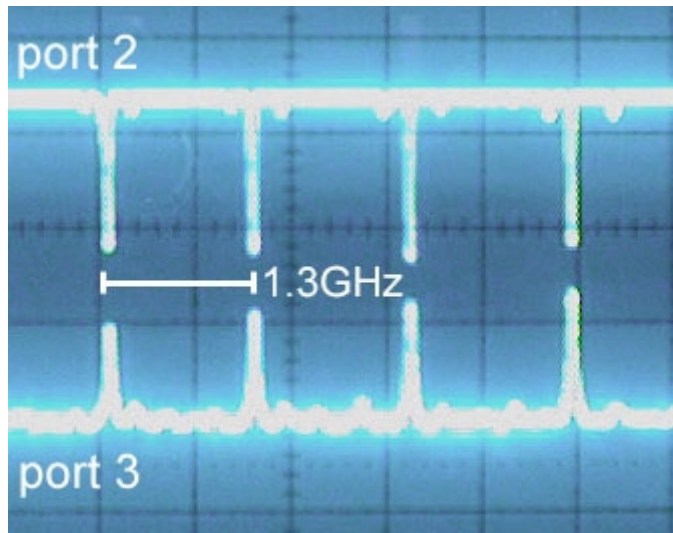
Fiber Taper Coupling to Microsphere WGMs



Transmission

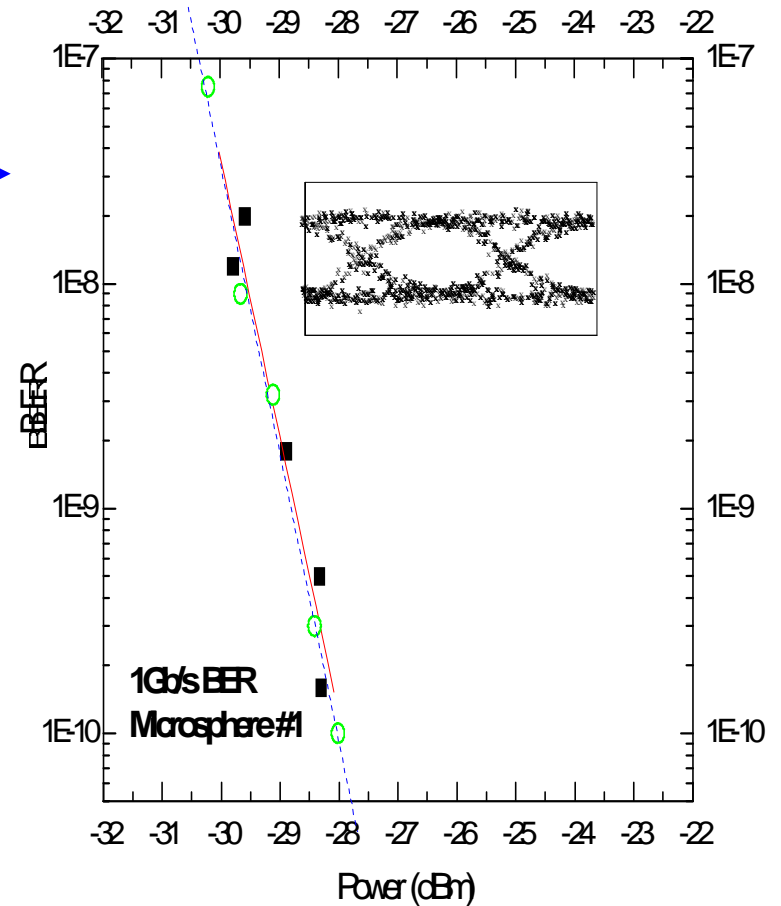
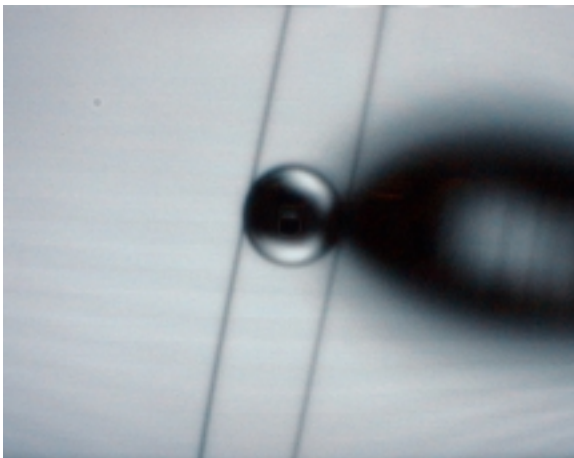
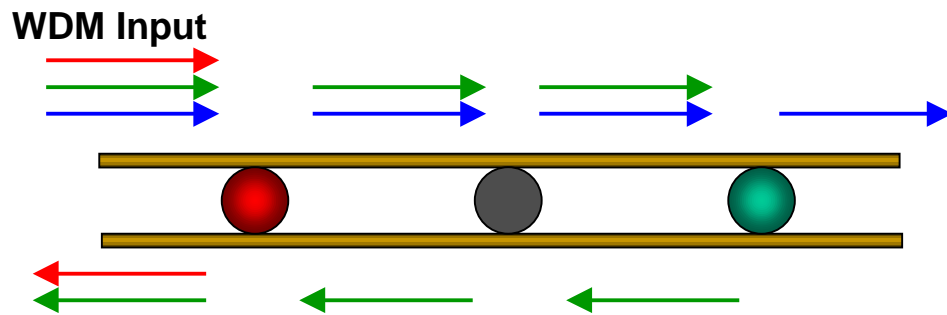


Four-port filter characteristics



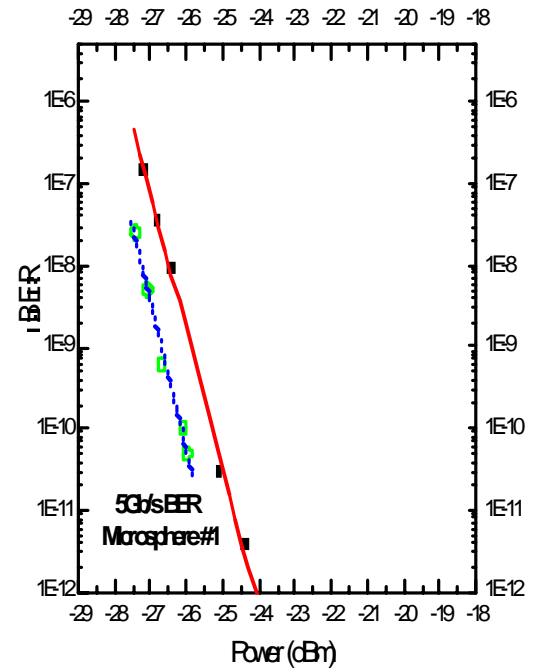
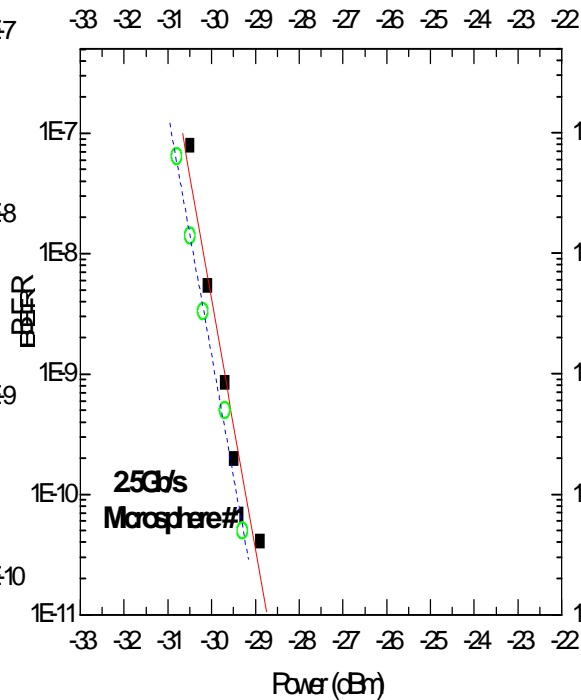
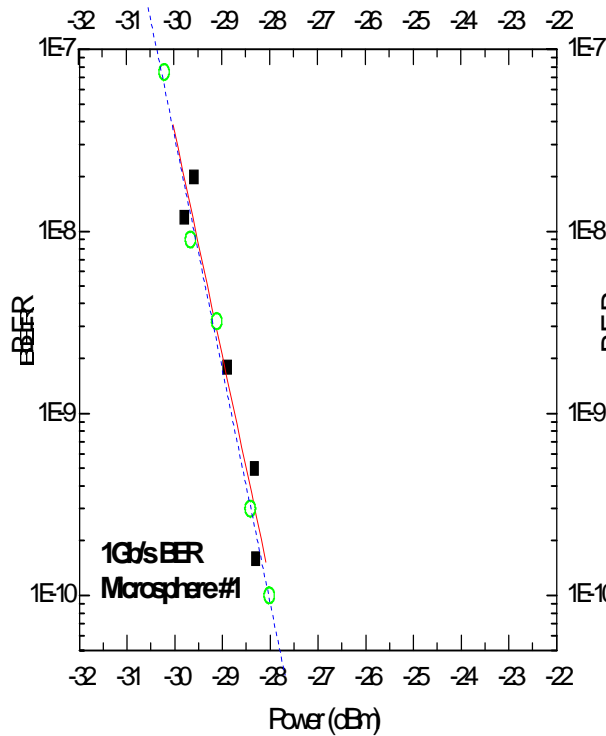
- P_2 / P_1 resonant extinction $> 28\text{dB}$
- Fully loaded $Q \approx 10$ million (tapers and spheres touching)

Add/Drop Bit-Error-Rate Test

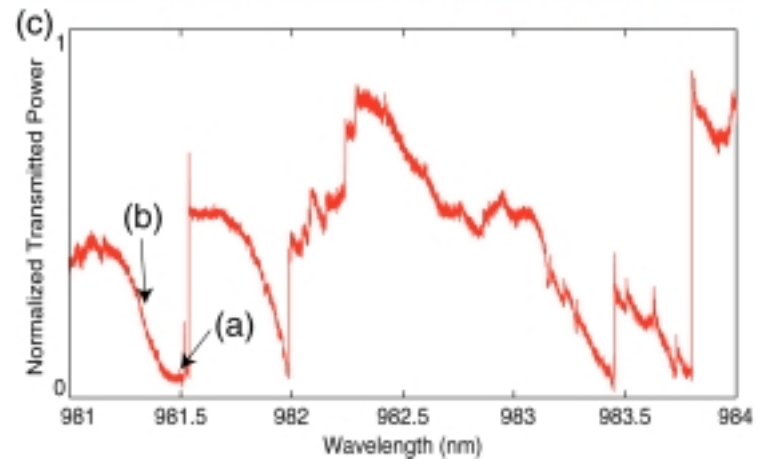
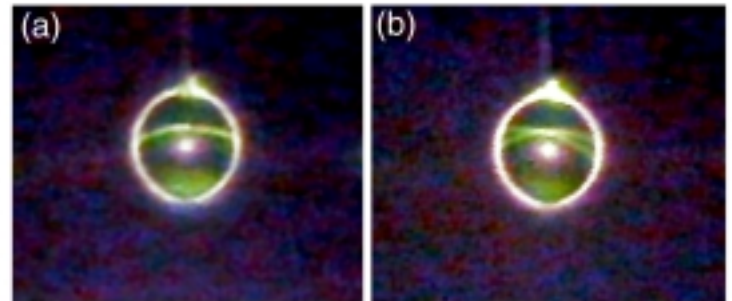
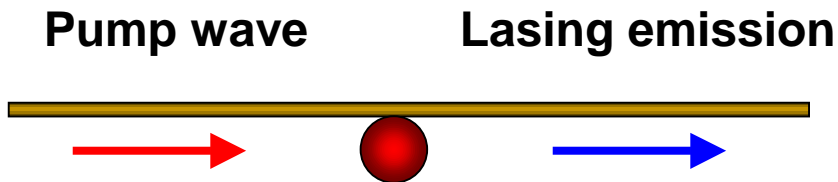


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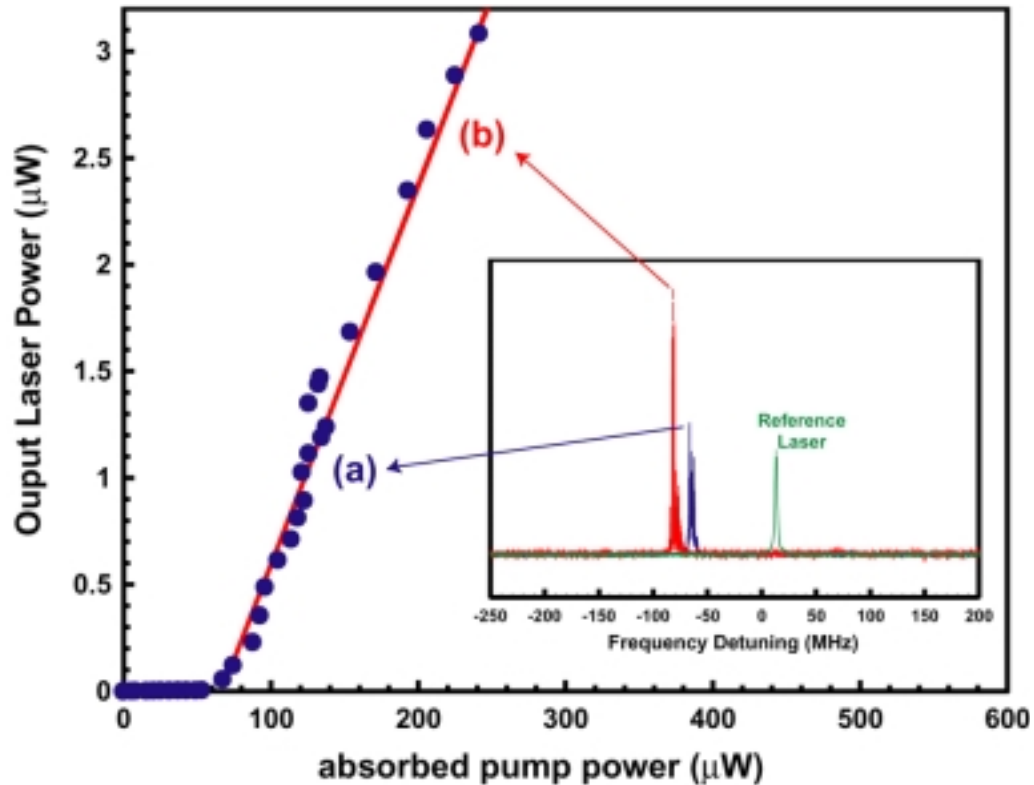
BER vs. Bandwidth



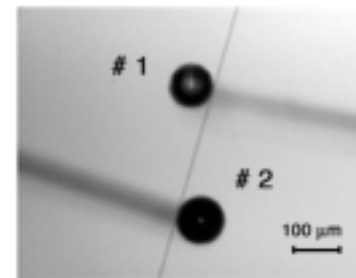
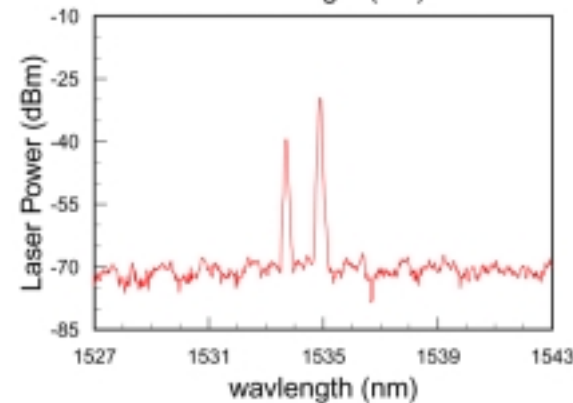
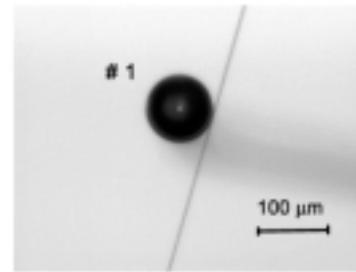
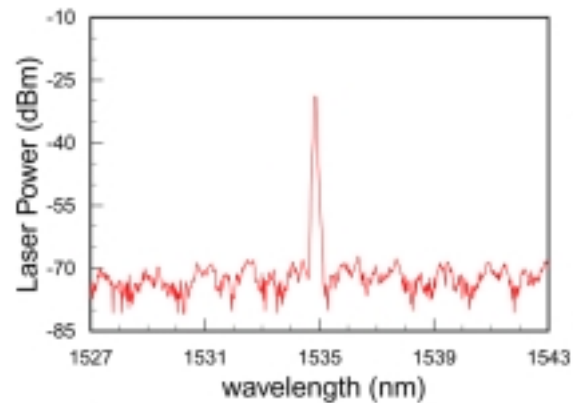
Fiber pumped microsphere laser



L-L Characteristic



Tandem Microsphere Lasers



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Summary

- **Taper-to-sphere coupling is highly efficient.**
- **Preliminary demonstrations:**
 - (1) **Filters. (All-fiber add/drops seem feasible at OC 192 rates).**
 - (2) **Compact, fiber-compatible lasers.**