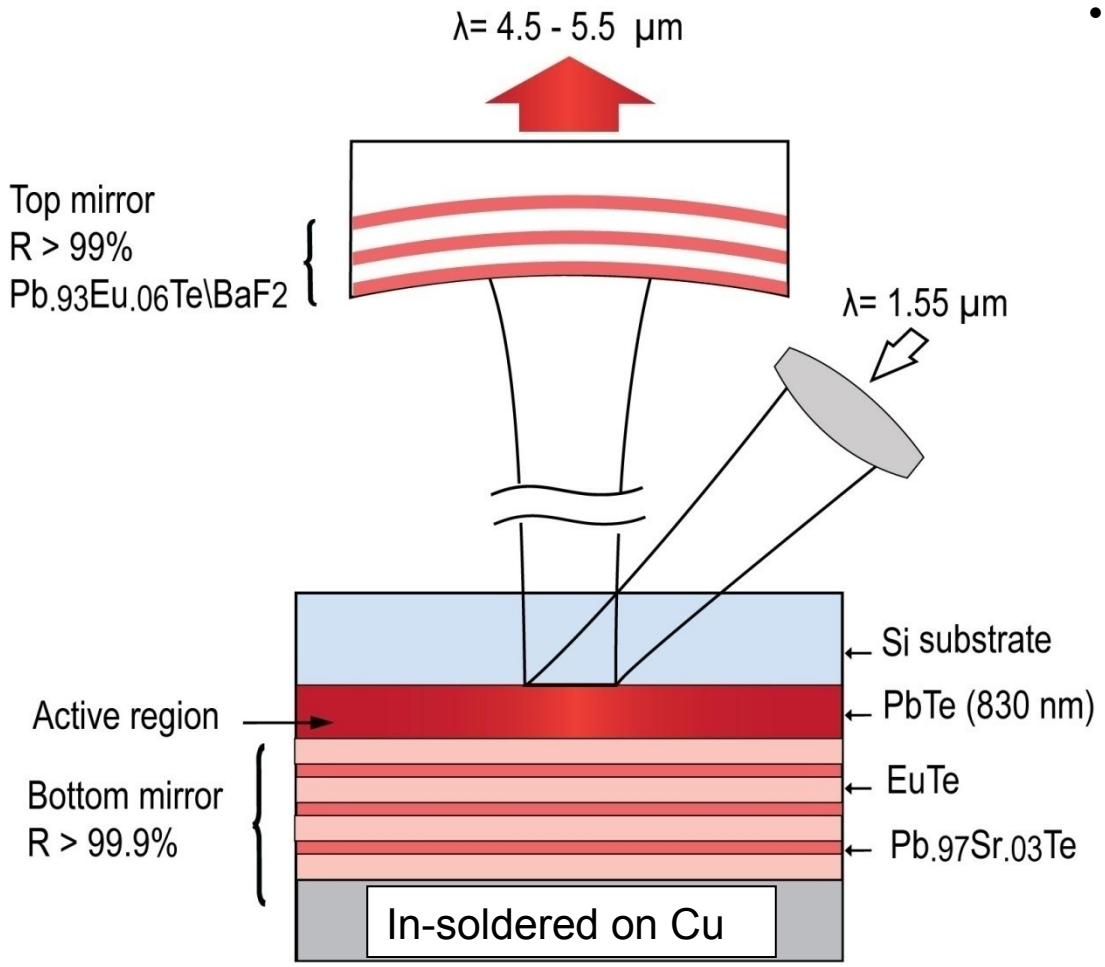
PbTe VECSEL on Si

VECSEL Design



- resonant design for ~130K

n_{PbSrTe} = ~ 5.7
n_{EuTe} = ~2.4
at 100 K

old results: Electr. Lett. 44, 2008: Si-sub was outside cavity, no soldering
new: Si-sub *inside* cavity & In/Cu heat spreader

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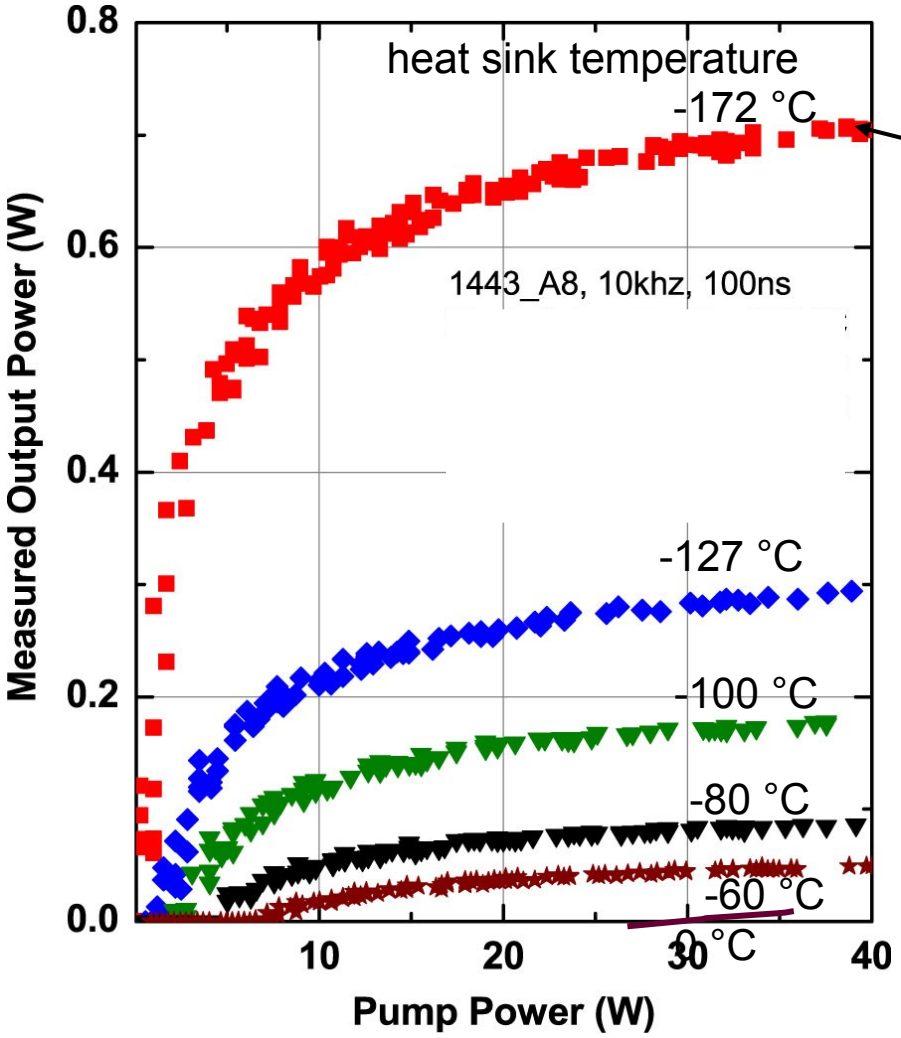
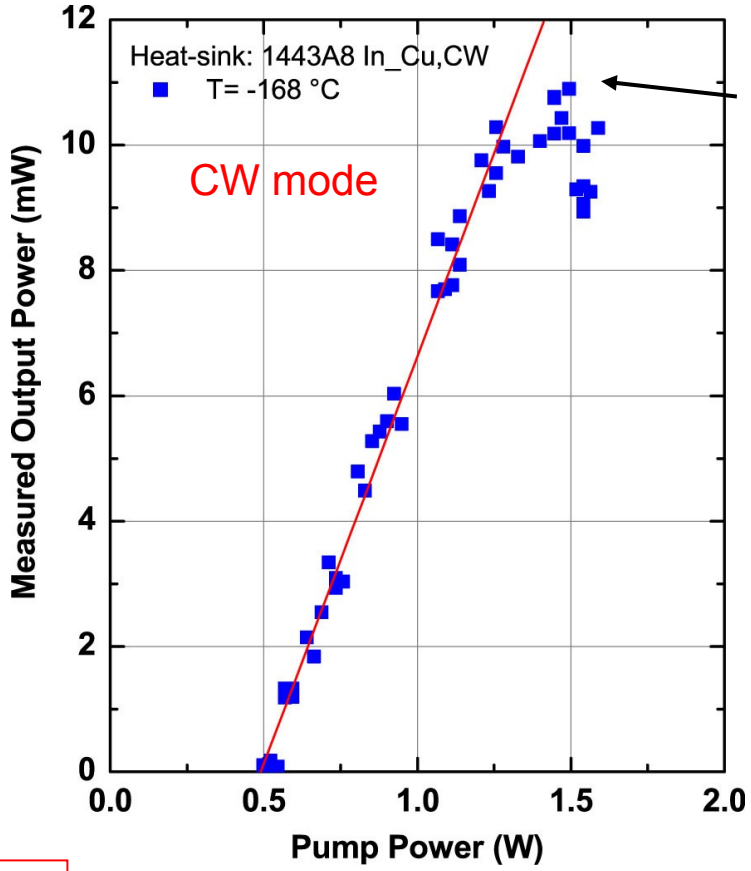


- Design for ~130K

1.2 Watt (corrected for window/lens losses)



~18 mW

- cw at 100K – 140K

Newest Results !

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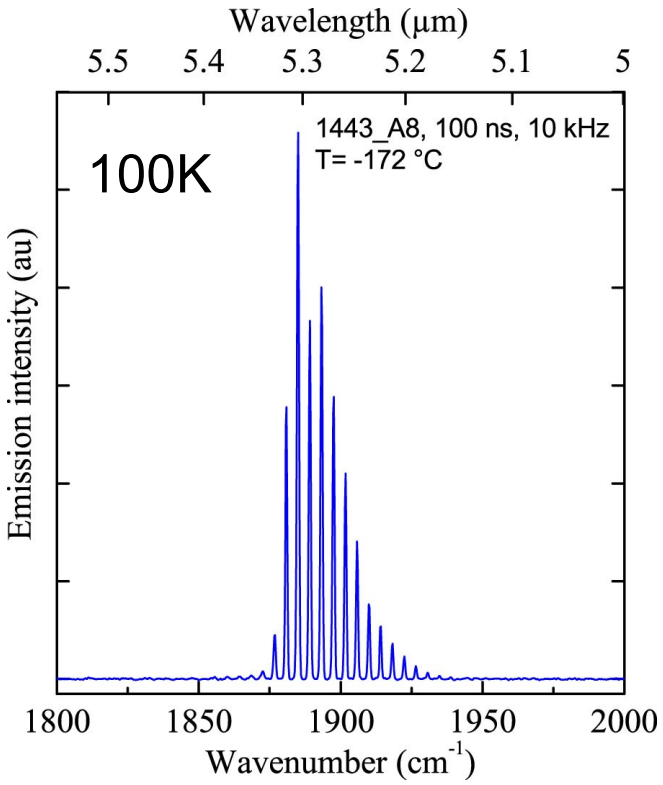
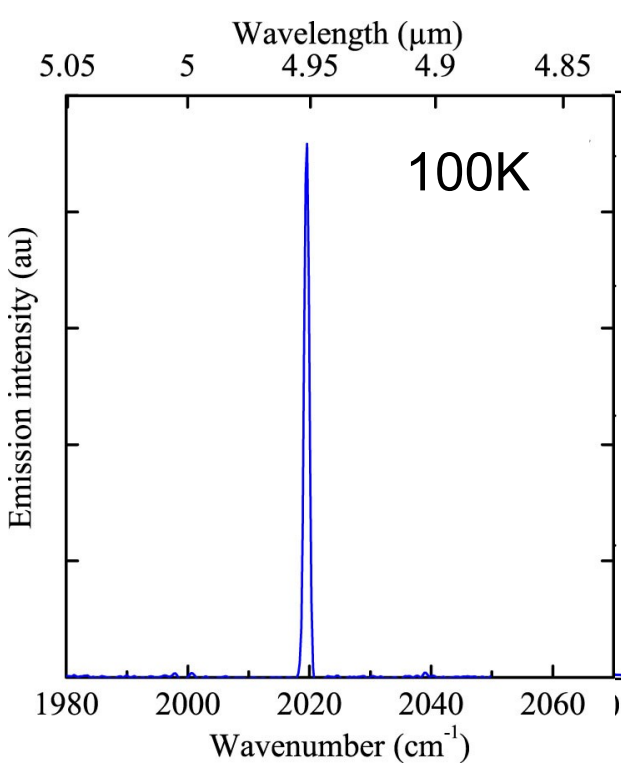
PbTe VECSEL on Si: spectra



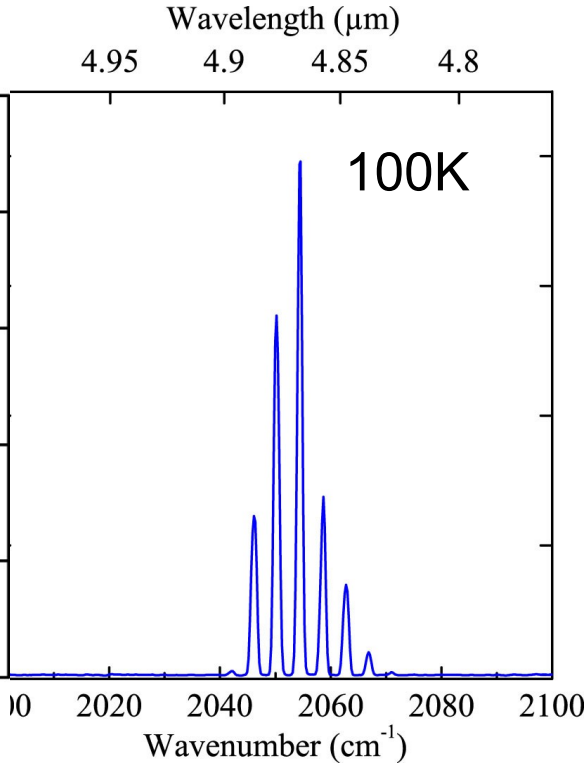
pulsed

cw

cw low power



cw 1.5W
(sample heats!)



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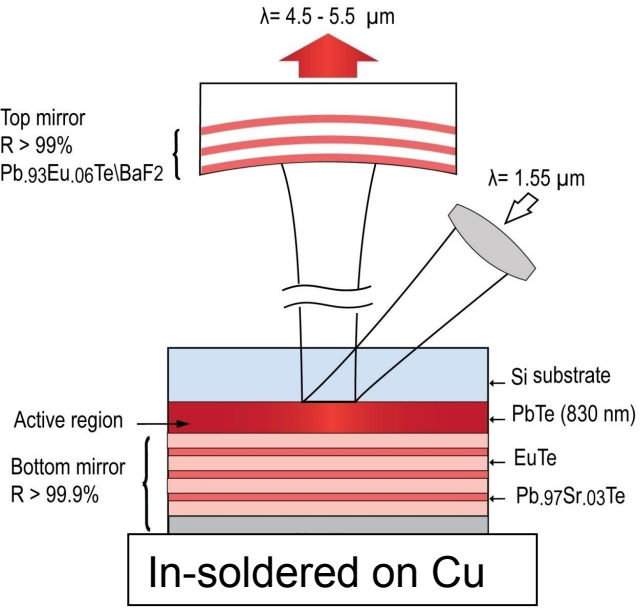
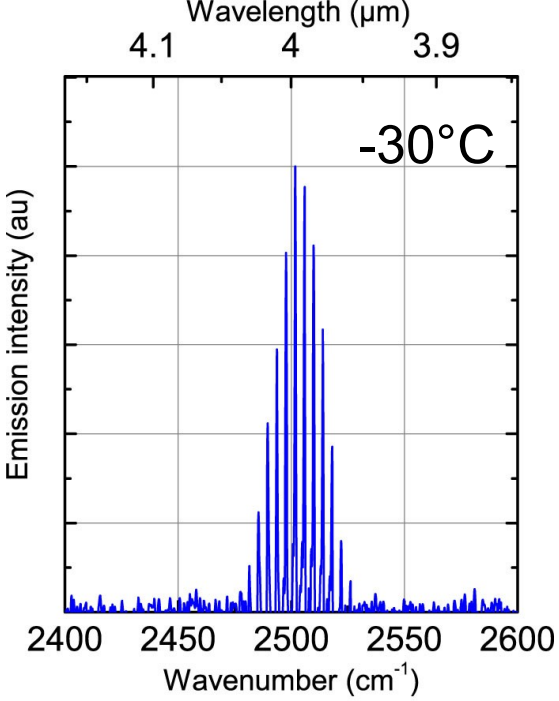


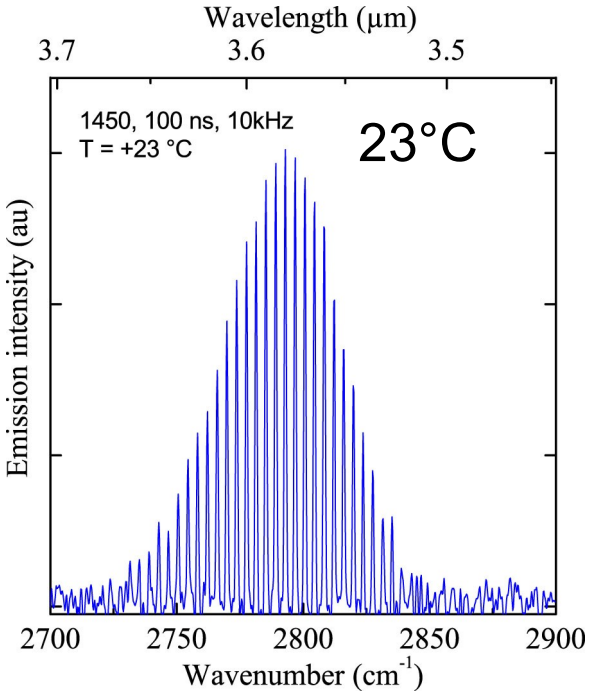
VECSEL design for 130K:
(830 nm PbTe active layer)

lasing up to 0°C
(heat sink temperature)



design for >200K:
(600 nm PbTe active layer)

lasing up to 25°C
(heat sink temperature)



higher n of substr → broader resonance peak → larger T-range

BaF_2: n = 1.45 → Si: n = 3.5

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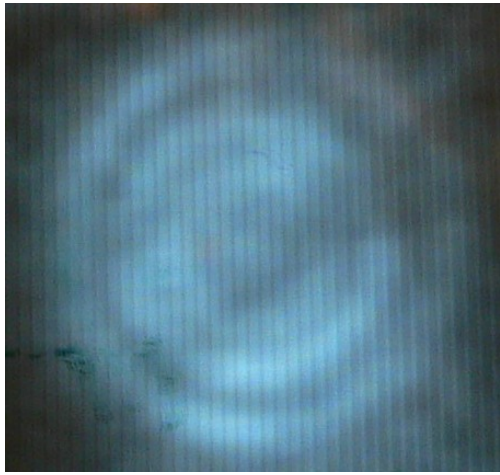
Beam Quality



Divergence Limit

$$\theta = M^2 \frac{\lambda}{\pi w_0}$$

$$M^2 = 1.3$$

$$\theta_{\perp,P} = 1.02$$