Hardware: common lidar architecture and (especially, but not limited to) new transmitters

System	JPL TMO (Table Mountain tropospheric Ozone) DIAL	TOPAZ (Tunable Optical Profiler for Aerosol and oZone) lidar	RO_3QET (Rocket-city O3 Quality Evaluation in the Troposphere) lidar	GSFC TROPOZ (TROPospheric OZone) DIAL	LMOL (Langley Mobile Ozone Lidar)
Affiliation	NASA/JPL	NOAA/ESRL	UAH	NASA/GSFC	NASA/LaRC
Location and mobility	Table Mountain, CA (fixed)	Boulder, CO (mobile)	Huntsville, AL (fixed, mobile soon)	Greenbelt, MD (mobile)	Hampton, VA (mobile)
Transmitter technology and wavelengths (nm)	4ω:Nd:YAG pumped gas cell (289, 299)	4ω:Nd:YLF pumped Ce:LiCAF (tunable, typ. 287, 291, 294)	4ω:Nd:YAG pumped gas cell (283, 289, 299)	4ω:Nd:YAG pumped gas cell (289, 299)	4ω:Nd:YLF pumped Ce:LiCAF (tunable, typ. 285, 291 with 527 for aerosol)
Receiver(s) (cm)	91, 5, 5	50	40, 10, 2.5	41, 2.5, 2.5	40
Data collection (photon counting, analog to digital)	PC, A/D	A/D, (PC soon)	PC	PC, A/D	A/D, PC
Ozone data range (km AGL)	0.1 - 23	0 - 3	0.1 - 12	0.2 – 12 (day) 0.2- 19 (night)	0.1 - 4

Discussion starters:

- Evolution of current systems as well as development of new systems. (Are the current systems meeting all the appropriate needs?)
  - Number and locations of additional systems (Is an ad hoc network sufficient or would these ultimately become “commercial” units?)
  - Is a common lidar architecture reasonable or achievable?

- System goals/specifications (as informed by the items above)
  - Summarize improvements that current TOLNET systems have found necessary (i.e what were the limitations?)
  - Accuracy and precision, temporal and spatial resolution, range coverage (e.g. low altitude coverage and maximum altitude range)
  - Compact, low cost, low maintenance, etc.
  - Unattended operation 24/7
  - Mobility
  - What are the prospects of new transmitter technologies?

Examples

- ESRL addition of photon counting to extend maximum range
- ESRL exploration of solid state Raman laser

Additional topics

- SBIR possibilities
- Other support for development

Solid-state Raman lasers: a tutorial

Jim Piper

Professor of Physics

Centre for Lasers and Applications, Macquarie University, Sydney

(Carnegie Centenary Professor, Heriot-Watt University, Edinburgh)

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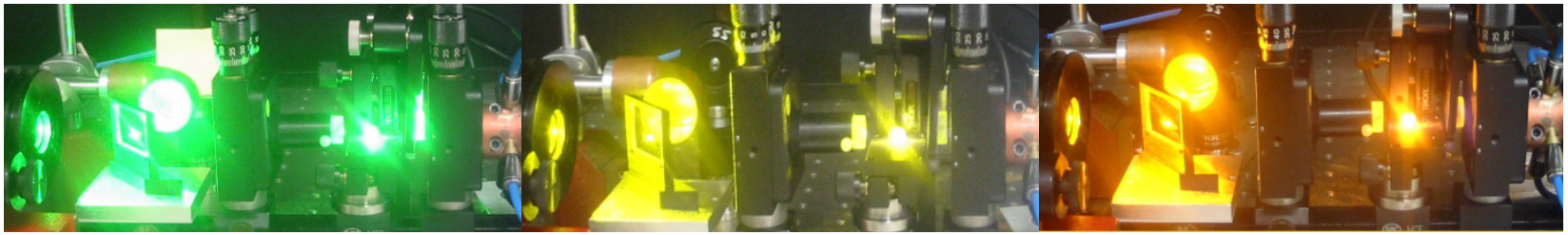
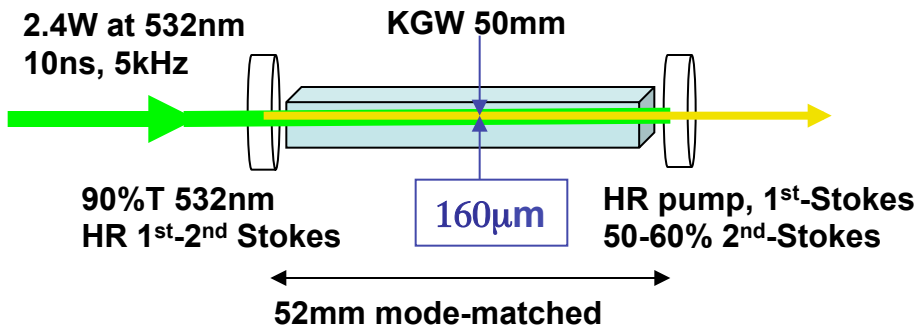
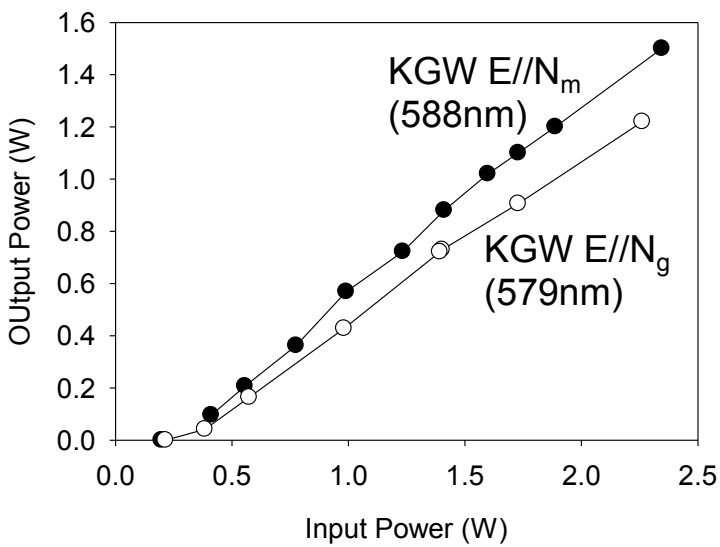


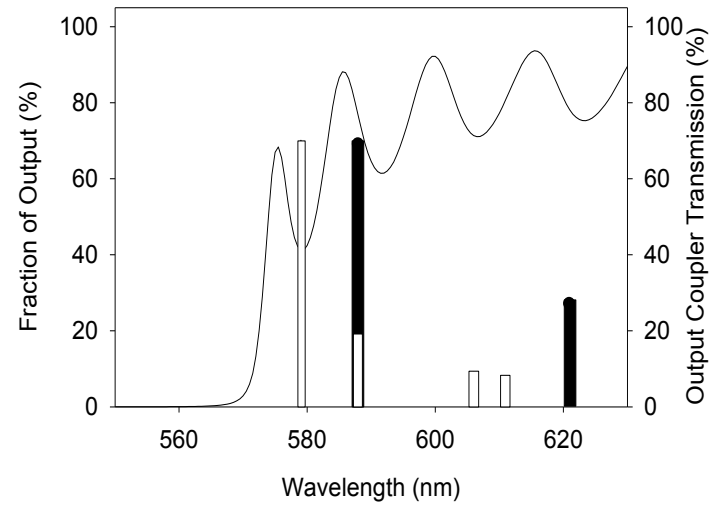
External-cavity Raman lasers

Mildren et al, *OSA Adv. Solid-State Photonics 2006*, MC3

*also Mildren et al, *Opt. Express* **12** (2004) 785; Pask et al, *Opt. Lett.* **28** (2003) 435.







Conversion efficiency into 2nd-Stokes at 588nm: 64% (slope eff. 78%); at 579nm: 58% (slope eff. 68%).