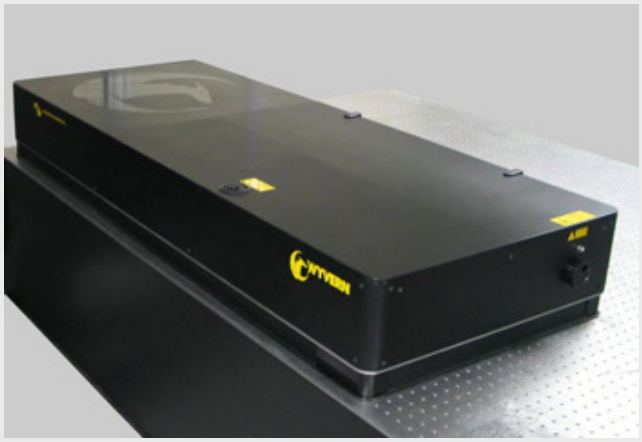
Kapteyn-Murnane Labs Technical Notes



Wyvern™ Regenerative Ultrafast Ti:sapphire Amplifier

The Wyvern is conceived as a robust, single-box architecture with excellent short and long-term stability. Moderate power Wyvern systems provide 10μJ class pulses at repetition rates up to 500kHz. Efficiency and stability are maximized using down-chirped pulse amplification. Higher power Wyvern systems add cryogenic cooling for unprecedented power and performance versatility from a single-stage amplifier, whether operating with 5mJ/ 1kHz pulses or μJ pulses approaching 1MHz

Distinguishing Capabilities Include:

- Generation of ultrashort pulses with bandwidth >20 nm
- Pulse duration options: <45 fs to <130 fs, with shorter pulse durations coming soon
- Output power >15 W (30 kHz), >15 W (100 kHz), 5W (1-5 kHz)
- Higher power versions include cryo-cooling.
- DPA or CPA versions [4,5]
- Ideally-suited for frequency conversion from 200 nm to 20 μm
- All-in-one box design for robust day-to-day operation
- Easy control via computer interface with DragonMaster software. This allows the user to:
  - Change repetition frequency
  - Run system diagnostics for performance tracking
  - Optimize for specific experiment giving the maximum in flexibility
- Applications:
  - High Harmonic Generation (HHG)
  - Femtosecond Chemistry
  - Micromachining
  - DUV/VUV generation
  - Ultrafast Surgery
  - Spectroscopy
  - Pump-Probe
  - Femto-Slicing
- Excellent beam quality
- Turn-key operation

KMLabs Inc.

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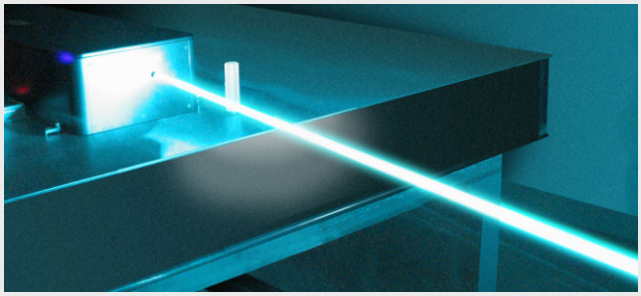
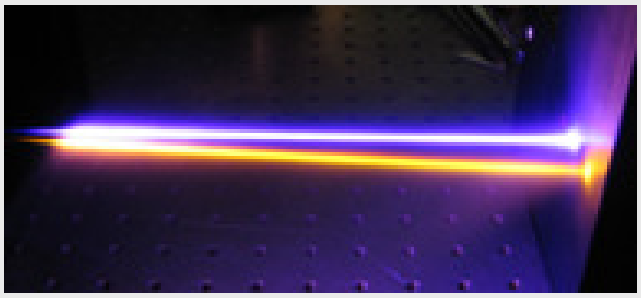
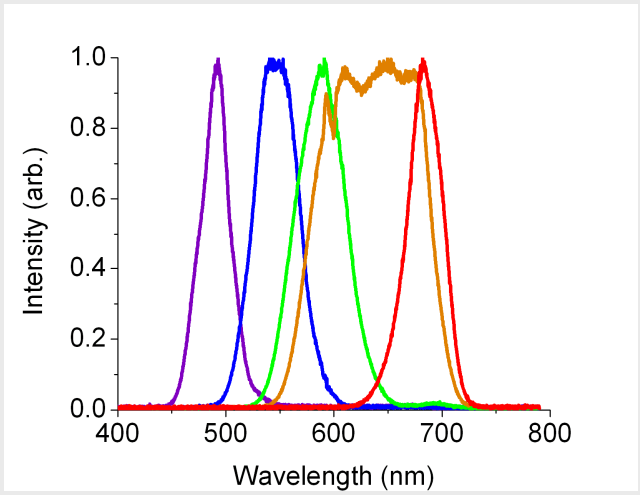
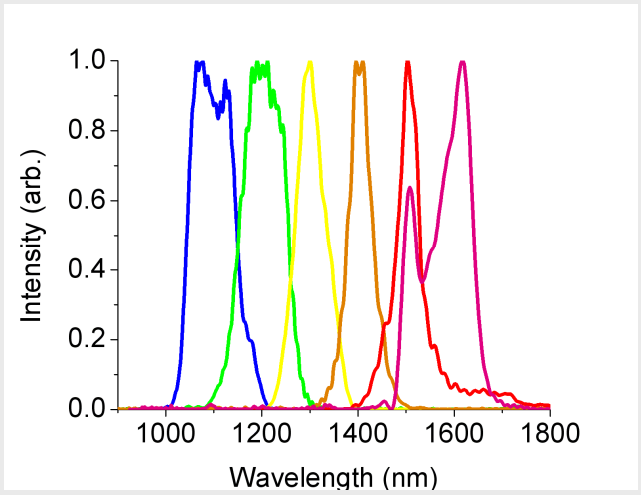


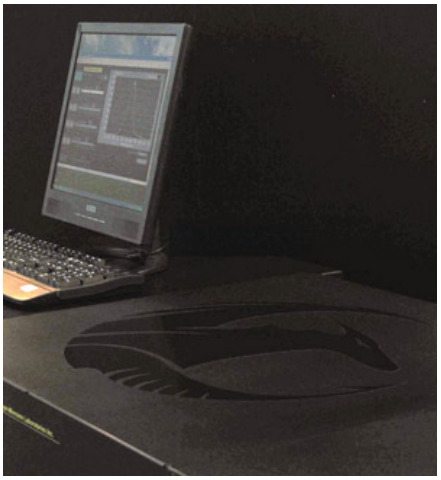






Wyvern NOPA, and OPA tuning curves for visible and IR

- Robust operation of the Wyvern allows for stable frequency conversion.
- Optional DPA gives highly efficient output [4,5].
- The Wyvern optical configuration is exceptionally stable.



References:

[1] http://jilawww.colorado.edu/pubs/thesis/holman/ch3.pdf
[2] S. Backus, C. Durfee, M. M. Murnane, and H. C. Kapteyn, "High Power Ultrafast Lasers,"Review of Scientific Instruments, vol. 69, pp. 1207-1223, 1998.
[3] E. Zeek, R. Bartels, M. M. Murnane, H. C. Kapteyn, S. Backus, and G. Vdovin, "Adaptive pulse compression for transform-limited 15-fs high-energy pulse generation," Optics Letters, vol. 25, pp. 587-589, 2000.
[4] H.C. Kapteyn and S.J. Backus, "Downchirped pulse amplification," U.S. Patent 7,072,101, July 4, 2006.
[5] D. Gaudiosi et al., *Optics Express 14*, 9277 (2006).

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