

DPSS Ultrafast Lasers: What are the good for???

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An overview of interesting and cutting edge research being done with Light Conversion PHAROS lasers and ORPHEUS OPA system. Ti:Saph systems are well established in the ultrafast world, and provide high pulse energy at few-kHz pulse repetition rates. However, they are notoriously large, often cumbersome, and tend to require substantial alignment & maintenance. Yb:KGW systems are directly diode pumped and so can be made compact and robust, but crystal limitations lead to pulse energies typically <2 mJ and pulse duration on the order of ~150 to 300 fs. Rather than competing with Ti:Saph, Yb:KGW systems tend to excel where Ti:Saph struggles, namely 10's of kHz up to ~1 MHz pulse repetition rates. The compact size and robustness of DPSS Yb:KGW ultrafast lasers, combined with high repetition rate and flexibility, is enabling new ultrafast applications in pump-probe spectroscopy, imaging, multi-photon polymerization for 3-d printing beyond the diffraction limit, and micromachining. Here I present a select few examples of cutting-edge research enabled by Yb:KGW ultrafast laser technology.