

Conference Presentations

K. J. Franz, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "A dual-wavelength quantum cascade laser with two optical transitions in each active region," *IPRM* Princeton, NJ, May 2006. **Best Student Paper Award**

K. J. Franz, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "Excited state and dual-wavelength quantum cascade lasers," *CLEO Semiconductor Laser Workshop* Long Beach, CA, June 2006.

A. Shen, H. Lu, M. C. Tamargo, W. Charles, I. Yokomizo, C. Y. Song, H. C. Liu, S. K. Zhang, X. Zhou, R. R. Alfano, K.J. Franz, and C. Gmachl, "Intersubband Transitions in MBE-grown Wide Bandgap II–VI Semiconductors," *NAMBE* Durham, NC, Oct 2006.

S. Zhang, X. Zhou, A. Shen, W. Wang, R. Alfano, H. Lu, W. O. Charles, I. Yokomizo, M. C. Tamargo, **K. J. Franz**, and C. Gmachl, "Optical Properties of Heavily Doped n-type CdSe Quantum Dots for Intersubband Device Applications," *MRS Fall Meeting* Boston, MA, Nov 2006.

K. J. Franz, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "Monolithic Mid-Infrared Integration of a Quantum Cascade Laser and a Passive Semiconductor Waveguide," *APS March Meeting* Denver, CO, Mar 2007.

K. J. Franz, D. Wasserman, A. J. Hoffman, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "Cascaded Emission in a Dual-Wavelength Quantum Cascade Laser," *PRISM/PCCM/MIRTHE Industry Day* Princeton, NJ, Mar 2007.

K. J. Franz, D. Wasserman, A. J. Hoffman, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "Cascaded Emission in a Dual-Wavelength Quantum Cascade Laser," *CLEO* Baltimore, MD, May 2007.

S. S. Howard, A. J. Hoffman, **K. J. Franz**, T. Ko, and C. Gmachl, "Current Injection Transition Broadening in Quantum Cascade Lasers," *ITQW Ambleside*, Cumbria, U.K., Sept 2007.

K. J. Franz, S. Menzel, A. J. Hoffman, D. Wasserman, K.-T. Shiu, S. R. Forrest, and C. Gmachl, "Excited State Optical Transitions in Quantum Cascade Lasers for Low Thresholds and Multi-Wavelength Emission," *ITQW Ambleside*, Cumbria, U.K., Sept 2007.

W. O. Charles, A. Shen, **K. J. Franz**, C. Gmachl, Q. Zhang, Y. Gong, G. F. Neumark, and M. C. Tamargo, "Asymmetric Coupled Quantum Well Structure for Quantum Cascade Laser Applications," *NAMBE Albuquerque*, NM, Sept 2007.

A. J. Hoffman, S. Scharfner, S. S. Howard, **K. J. Franz**, F. Towner, and C. Gmachl, "Low-Voltage Defect Quantum Cascade Laser with Heterogeneous Injector Regions," *IEEE LEOS Annual Meeting Lake Buena Vista*, FL, Oct 2007.

S. S. Howard, A. J. Hoffman, **K. J. Franz**, D. P. Howard, T. Ko, D. L. Sivco, and C. F. Gmachl, "Effect of Injection Barrier Thickness and Doping on Transport and Gain in a $\lambda = 8.2 \mu\text{m}$ Quantum Cascade Laser," *IEEE LEOS Annual Meeting Lake Buena Vista*, FL, Oct 2007.

K. J. Franz, A. J. Hoffman, S. S. Howard, Z. J. Liu, S. Menzel, S. Scharfner, D. Wasserman, and C. Gmachl, "Mid-Infrared Quantum Cascade Lasers," *Mauterndorf Winterschool* Bad Hofgastein, Austria, Feb 2008.

K. J. Franz, S. Menzel, A. J. Hoffman, D. Wasserman, J. W. Cockburn, and C. Gmachl, "High k -Space Lasing in a Dual Optical Transition Quantum Cascade Laser," *Mauterndorf Winterschool* Bad Hofgastein, Austria, Feb 2008. poster presentation

K. J. Franz, S. Menzel, A. J. Hoffman, D. Wasserman, J. W. Cockburn, and C. Gmachl, "Excited State Quantum Cascade Lasers and Lasing in k -Space," *PRISM/PCCM/MIRTHE Industry Day* Princeton, NJ, Mar 2008.

M. D. Escarra, A. J. Hoffman, S. S. Howard, **K. J. Franz**, A. Sridhar, and C. Gmachl, "High Efficiency Quantum Cascade Lasers," *APS March Meeting* New Orleans, LA, Mar 2008.

W. O. Charles, **K. J. Franz**, A. Shen, M. C. Tamargo, and C. Gmachl, "Growth and properties of wide band gap II–VI multi-quantum well structures for mid-infrared quantum cascade lasers," *APS March Meeting* New Orleans, LA, Mar 2008.

M. A. Talukder, F.-S. Choa, C. R. Menyuk, **K. J. Franz**, S. S. Howard, C. F. Gmachl "Novel Heat Removal Waveguide Structure for High Performance Quantum Cascade Lasers," *CLEO* San Jose, CA, May 2008. poster presentation

A. J. Hoffman, S. Schartner, S. S. Howard, **K. J. Franz**, F. Towner, and C. Gmachl, "Low Voltage Defect Heterogeneous Quantum Cascade Laser," *CLEO* San Jose, CA, May 2008.

S. Menzel, **K. J. Franz**, D. Wasserman, A. J. Hoffman, J. W. Cockburn, and C. F. Gmachl, "Laser Action at High k -Space Values in Anti-Correlated Multi-Wavelength Quantum Cascade Lasers," *CLEO* San Jose, CA, May 2008.

K. J. Franz, W. O. Charles, A. Shen, A. J. Hoffman, M. C. Tamargo, and C. Gmachl, "Intersubband Electroluminescence from a ZnCdSe/ZnCdMgSe Quantum Cascade Structure," *CLEO* San Jose, CA, May 2008.

Y. Dikmelik, J. B. Khurgin, A. J. Hoffman, S. S. Howard, **K. J. Franz**, and C. F. Gmachl, "Excited-State Absorption in High-Power Mid-Infrared Quantum Cascade Lasers," *CLEO* San Jose, CA, May 2008. poster presentation

K. J. Franz, W. O. Charles, A. Shen, A. J. Hoffman, M. C. Tamargo, and C. Gmachl, "Electroluminescence from a ZnCdSe/ZnCdMgSe Quantum Cascade Structure," *ICPS* Rio de Janeiro, Brazil, July 2008. poster presentation

K. J. Franz, S. Menzel, D. Wasserman, A. J. Hoffman, J. W. Cockburn, and C. Gmachl, "High k -Space Lasing in Excited State Quantum Cascade Lasers," *ICPS* Rio de Janeiro, Brazil, July 2008.

A. Shen, W. O. Charles, B. S. Li, **K. J. Franz**, C. Gmachl, Q. Zhang, and M. C. Tamargo, "Wide Band Gap II-Selenides for Short Wavelength Intersubband Devices," *MBE2008* Vancouver, Canada, Aug 2008.

A. J. Hoffman, M. D. Escarra, S. S. Howard, **K. J. Franz**, X. Wang, J.-Y. Fan, and C. Gmachl, "Strategies for Improved Wall-plug Efficiency in Quantum Cascade Lasers," *MIOMD IX* Freiburg, Germany, Sept 2008.

K. J. Franz, W. O. Charles, A. Shen, A. J. Hoffman, M. C. Tamargo, and C. Gmachl, "Quantum Cascade Electroluminescence from a ZnCdSe/ZnCdMgSe on InP Structure," *MIOMD IX* Freiburg, Germany, Sept 2008.

Y. Yao, Z. Liu, A. J. Hoffman, **K. J. Franz**, and C. F. Gmachl, "Voltage tunability of quantum cascade lasers," *IQCLSW* Monte Verita, Switzerland, Sept 2008.

Y. Dikmelik, J. B. Khurgin, A. J. Hoffman, S. S. Howard, **K. J. Franz**, and C. F. Gmachl, "Excited-State Absorption in High-Power Mid-Infrared Quantum Cascade Lasers," *IQCLSW* Monte Verita, Switzerland, Sept 2008. poster presentation

M. D. Escarra, A. J. Hoffman, S. S. Howard, **K. J. Franz**, X. Wang, M. Fong, and C. F. Gmachl, "Improved Voltage Efficiency in Quantum Cascade Lasers," *IQCLSW* Monte Verita, Switzerland, Sept 2008. poster presentation

W. O. Charles, **K. J. Franz**, A. Shen, Q. Zhang, C. Gmachl, and M. C. Tamargo, "Growth and Characterization of $\text{Zn}_x\text{Cd}_{1-x}\text{Se}$ / $\text{Zn}_{x'}\text{Cd}_{y'}\text{Mg}_{1-x'-y'}\text{Se}$ Quantum Cascade Emitters," *IQCLSW* Monte Verita, Switzerland, Sept 2008.

K. J. Franz, P. Q. Liu, A. J. Hoffman, S. S. Howard, M. D. Escarra, Y. Dikmelik, J. B. Khurgin, X. Wang, J.-Y. Fan, and C. Gmachl, "Short Injector Regions for Improved Quantum Cascade Laser Performance," *IQCLSW* Monte Verita, Switzerland, Sept 2008. **Invited**

Y. Yao, **K. J. Franz**, Z. Liu, A. J. Hoffman, and C. F. Gmachl, "Voltage tuning of gain spectra in quantum cascade lasers," *Photonics West* San Jose, CA, Feb 2009.