

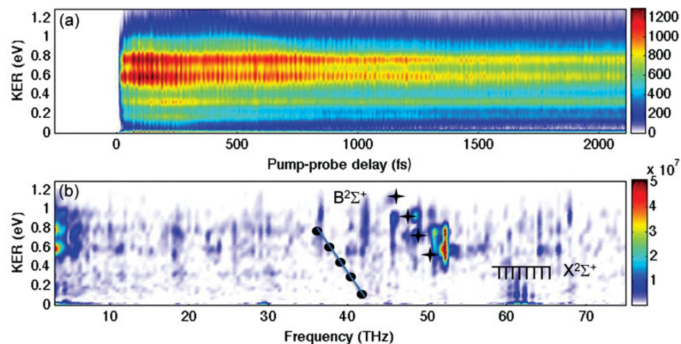
# CO<sup>+</sup> dissociation dynamics

Progress Report - July 19, 2013

Alex Kramer

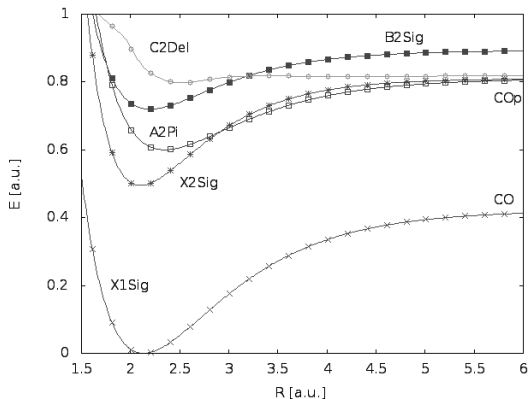
# Previous Experimental Results

De S., et al., 2011 [1]:



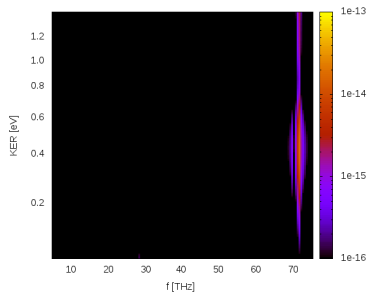
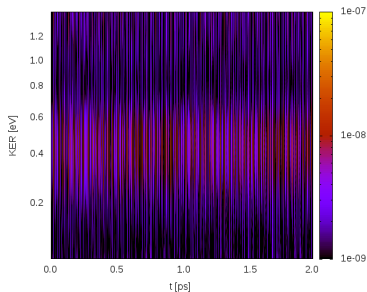
- ▶ 800 nm, approx. 8 fs,  $3 \times 10^{14}$  W / cm<sup>2</sup> pump/probe laser pulses
- ▶ Up to 2 ps. delay between pulses

# Theoretical Method



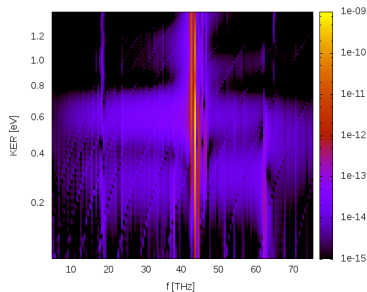
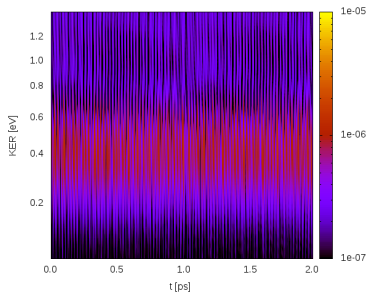
- ▶ 15 fs. laser pulses, up to 2 ps. delay between pulses
- ▶ Coupled  $X^2\Sigma^+$ ,  $A^2\Pi$ , and  $B^2\Sigma^+$   $\text{CO}^+$  states with  $C^2\Delta$  state for probe pulse

# $X^2\Sigma^+$ Results



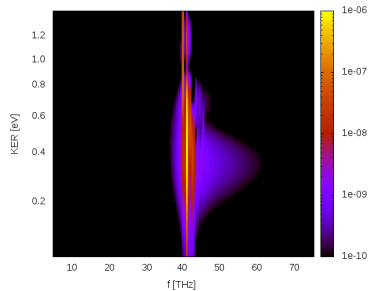
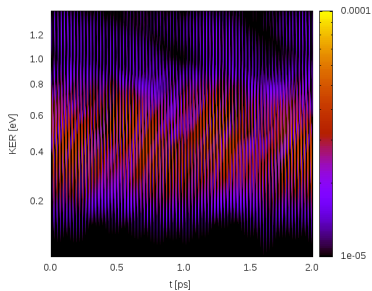
- ▶ Consistent with lower “streak” in experimental KER( $t$ ) results
- ▶ No clear match in experimental power spectra

# $A^2\Pi$ Results



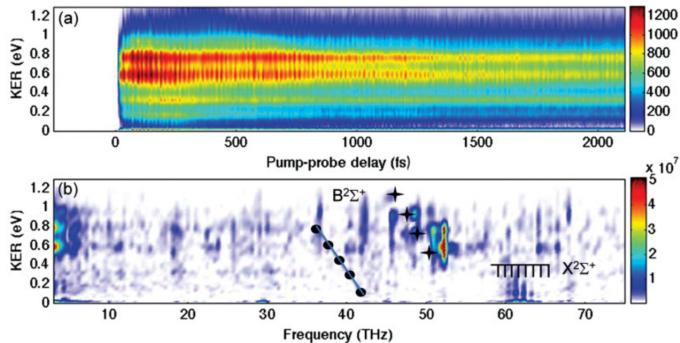
- ▶ Consistent with lower “streak” in experimental KER(t) results
- ▶ No clear match in experimental power spectra

# $B^2\Sigma^+$ Results



- ▶ In same KER( $t$ ) range as experimental results, but no clear match
- ▶ No clear match in experimental power spectra

# Interpretation



- ▶ Simulated results fail to explain experimental KER spectra
- ▶ No  $\text{CO}^+$  molecular potential curve explains 50 THz power spectra results

## References

- [1] De, S. et al. "Following dynamic nuclear wave packets in N<sub>2</sub>, O<sub>2</sub>, and CO with few-cycle infrared pulses." *Physical Review A* 84, 043410 (2011).