On the Control of Product Yields in the Photofragmentation of Deuteriumchlorid Ions (DCl$^+$) – Cl + D$^+$ $< - -$ DCl$^+$ $- - >$ Cl$^+$ + D.$^1$ KARL-MICHAEL WEITZEL, GEORG BREUNIG, ALEXANDRA LAUER, Philipps Universitaet Marburg, FB Chemie, Germany, MIKHAIL KOROLKOV, Academy of Science, Minsk, Belarus — We have investigated the prospect of controlling the photofragmentation of deuterium chloride ions (DCl$^+$) via ultra short IR laser pulses both by experiments and by numerical solution of coupled Schrödinger equations. The calculations provide evidence that the ratio of product ion yields Cl$^+$ versus D$^+$ can be manipulated by appropriate choice of laser pulse parameters, in particular central laser wavelength, pulse duration, intensity and chirp [1]. The analysis of time dependent populations reveals phase sensitive competition between intra- and inter-electronic state excitation. Complementary, we have performed one- and two-color fs experiments looking at the dissociation of DCl$^+$ ions at 800 nm [2] and in the range from 3.5$\mu$m to 7.5$\mu$m (2857cm$^{-1}$ to 1333cm$^{-1}$) [3]. In particular we show, that the ratio of product yields D$^+$/Cl$^+$ can be controlled via the chirp of the laser pulse at 4.5$\mu$m. References [1] M.V. Korolkov, K.-M. Weitzel, J. Chem. Phys. 123, 164308, (2005) [2] H.G. Breunig, A. Lauer, K.-M. Weitzel, Proceedings of the Femtochemistry VII (2005) [3] H.G. Breunig, K.-M. Weitzel, in preparation.$^1$Supported by INTAS and the DFG.