PHOTOIONIZATION OF CARBON DIOXIDE IN THE MOLECULAR FRAME. Carolyn M. Healy & Varun Makhija, Dept. Of Chemistry and Physics, University of Mary Washington. Measurements from isolated molecules are averaged over all molecular orientations because they are free to rotate: these are lab frame measurements. Recently, we determined a mathematical transformation that can transform such measurements into the molecular frame for the specific case of photoionization – the removal of an electron from the molecule with light. Specifically, the probability distribution of the ejected electron can be determined in the molecular frame from lab frame measurements. Here, we apply this method to photoelectron distributions from freely rotating isolated carbon dioxide molecules by our collaborators at the University of Southampton and the University of Nottingham. The results are compared with quantum mechanical calculations from our collaborators at Charles University. Author contact: chealy2@mail.umw.edu