

Accurate Measurement and Physical Insight: The X-ray Extended Range Technique for high accuracy absolute XAFS by transmission and fluorescence

C. T. Chantler

School of Physics, University of Melbourne, Parkville, VIC, Australia

Over recent synchrotron experiments (PRA67 (2003) 042716, PRL90 (2003) 257401, PRA69 (2003) 257401, PRA69 (2004) 042101, PRA71 (2005) 032702) we have developed methods for measuring the absorption coefficient in the XAFS region and far from an edge in neutral atoms, simple compounds and organometallics which can reach accuracies of below 0.02%. This is 50 - 500 times more accurate than earlier methods, and 50 - 250 times more accurate than claimed uncertainties in theoretical computations for these systems. The experiments are sensitive to many theoretical and computational issues, including correlation. We will discuss key features of the method and results, including especially theoretical issues raised by the new accuracies.