## Abstract Submitted for the TSS17 Meeting of The American Physical Society

Determining the density if the ionic liquid [C10MPy][Tf2N] confined in silica nano pores using small-and wide-angle x-ray scattering MELISSA CANO, Department of Physics, The University of Texas at El Paso, PASQUALE FULVIO, Department of Chemistry, University of Puerto Rico, Rio Piedras, GERNOT ROTHER, Chemical Sciences Division, Oak Ridge National Laboratory, JOSE LEOBARDO BANUELOS, Department of Physics, The University of Texas at El Paso — The structure of the ionic liquid (RTIL), [C10MPy] [Tf2N], confined in silicas with 8 nm and 2.8 nm pores was investigated. RTILs have negligible volatility, excellent thermal and electrochemical stability, and are of interest in areas such as nano-lubrication, energy storage, and environmental and materials synthesis. The dynamics, structure, and thermodynamics of RTILs under confinement are not completely understood, vet elucidating these properties is key to new advancements. Previously, confined RTIL dynamics were probed with neutron spin echo spectroscopy (NSE), and structural properties were probed with small-angle neutron scattering. In this work, small- and wide-angle x-ray scattering (SWAXS) results (Q-range: $0.01-3\text{\AA}^{-1}$ ) of the confined RTIL are presented. The higher Q-range in these new measurements gives access to inter-ion distances, and allows us to correlate them to the RTIL density inside pores and the NSE dynamics. The confined RTIL density was obtained by calculating the scattering invariant and applying a model to the empty and RTIL-filled silicas. The relation between RTIL structural peak parameters and measured density and dynamics will be discussed.

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