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Ionic liquids have experienced great interest from academia as well as industry over the past two decades. Ionic liquids are salts that exist in liquid state at room-temperature; hence, they represent fluids solely consisting of ions. As a consequence, many of them exhibit interesting properties such as non-volatility, non-flammability, and high electro-conductivity. However, the behavior at molecular level and how it relates to the macroscopic properties of ILs is yet to be understood.

In a previous ECONOS meeting we have shown the first application of time-resolved femtosecond CARS to room-temperature ionic liquids for studying vibrational dynamics of imidazolium-based ILs. The continuation of this work has now led to the discovery of an unexpected vibrational energy transfer between the counter-ions via hydrogen bonds [1]. We present results from a systematic series of ILs which allow identification of the energy transfer mechanism and enable a further unraveling of the complicated structure-property relationships in this fascinating class of material.

[1] M. Namboodiri, M.M. Kazemi, T.Z. Khan, A. Materny, J. Kiefer, Journal of the American Chemical Society, in press, 2014 (DOI: 10.1021/ja502527y).

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