# EXPLORING THE PHASE DIAGRAM OF MOLECULAR CONDUCTORS DURING PHOTO-INDUCED DYNAMICS

**R.Bertoni[1], N. Godin[1], G. Privault[1], J-C. Ameline[1], E. Trzop[1], M. Maesato[2], H. Yamochi[2], G. Saito[3]**

*[1]Univ Rennes, CNRS, IPR (Institut de Physique de Rennes) - UMR 6251, F-35000 Rennes, France*
*[2]Division of Chemistry, Graduate School of Science, Kyoto University, Kyoto 606-8502, Japan*
*[3]Toyota Physical and Chemical Research Institute, Yokomichi 41-1, Nagakute 480-1192,*
*e-mail: roman.bertoni@univ-rennes1.fr*

New methods have emerged during the last decade for studying and controlling molecular conductors, and more generally correlated materials, with the use of external dynamical control parameters such as electric field or light pulse. It allows acting dynamically on materials and thus explore what lies behind the "static" picture. So far, those studies relying on ultrashort pulses to disturb and monitor the system during its out-of- equilibrium journey were restricted to the sole use of temperature as control parameter to depart from point in a phase diagram. Nevertheless, other control parameters such as hydrostatic pressure are mandatory to explore the wealth of phase space and may tune fundamental quantities such as electronic correlations. Recent publications have demonstrated the interest of coupling the control of temperature and pressure for time resolved studies [1,2]. We have developed a robust setup allowing to perform P/T tunable time-resolved experiment. Indeed, it grants access to a broad phase space spanning 0-7 kbars and 300-10 K, well suited for studies of soft correlated molecular crystals.

In a benchmark study, we investigated the response of the organic salt (EDO-TTF)2SbF6 to ultrashort light excitation in a control environment (Pressure, Temperature). Indeed, this material exhibits a gigantic photo-response with modulation of reflectivity up to 120% [3] and re-entrant transition at room temperature upon hydrostatic pressure [4]. Our preliminary results suggest a possible charge-order state under hydrostatic pressure based on the activation of coherent optical phonons upon photo-excitation. Furthermore, the response at longer timescale modulated by acoustic contribution reveals lattice stiffening upon hydrostatic pressure. This successful demonstration paves the way for a systematic investigation of the phase diagram of correlated molecular materials upon ultrafast photo-excitation.

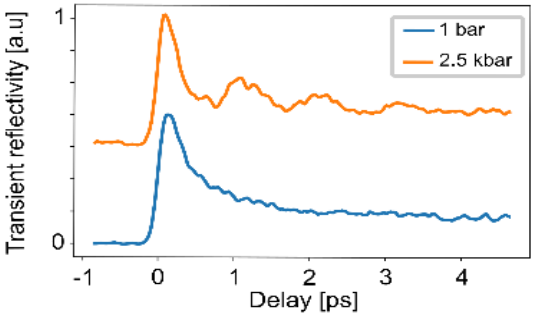


**Figure** Time-resolved transient reflectivity after photo-excitation of $(EDO\text{-}TTF)_2SbF_6$ at room temperature.

## References

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