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The nature of the β-peak in the loss modulus of amorphous solids
YOSSI COHEN[1], Department of Chemical Physics, The Weizmann Institute of Science, Rehovot 76100, Israel, SMARAJIT KARMAKAR, Dept of Physics, Universita di Roma La Sapienza, Piazale Aldo Moro 2, Rome, Italy, ITAMAR PROCACCIA, Department of Chemical Physics, The Weizmann Institute of Science, Rehovot 76100, Israel, KONRAD SAMWER, Dept of Physics, University of Gottingen, Germany — Glass formers exhibit, upon an oscillatory excitation, a response function whose imaginary and real parts are known as the loss and storage moduli respectively. The loss modulus typically peaks at a frequency known as the α frequency which is associated with the main relaxation mechanism of the super-cooled liquid. In addition, the loss modulus is decorated by a smaller peak, shoulder or wing which is referred to as the β-peak. The physical origin of this secondary peak had been debated for decades, with proposed mechanisms ranging from highly localized relaxations to entirely cooperative ones. Using numerical simulations, we expose a clear and unique cooperative mechanism for the said β-peak which is distinct from that of the α-peak.

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