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Renewal Events in Glass-Forming Liquids – Glass Dynamics with Ideal Age Zero JULIAN HELFFERICH, FALKO ZIEBERT, Institut Charles Sadron, CNRS, Strasbourg, France and Universität Freiburg, Freiburg, Germany, HENDRIK MEYER, STEPHAN FREY, JÖRG BASCHNAGEL, Institut Charles Sadron, CNRS, Strasbourg, France, KATHARINA VOLLMAYR-LEE, Department of Physics and Astronomy, Bucknell University, Lewisburg, Pennsylvania 17837, USA, ALEXANDER BLUMEN, Universität Freiburg, Freiburg, Germany — When a glass-forming liquid is cooled through the glass transition temperature, the system falls out of equilibrium and evolves slowly over time in a process called physical aging. During aging, dynamic observables depend on the history of the process, i.e. the time since vitrification and the quenching procedure, hampering any attempt to directly compare the dynamics of different glass formers. The continuous-time random walk (CTRW) interpretation, however, offers a remedy for the history dependence of the dynamic observables. This interpretation is based on the observation that single-particle trajectories display hopping-like motion, i.e. long periods of localization interrupted by fast "jumps." In the CTRW picture, these jumps are renewal events, i.e. each particle carries its own "internal clock" which can be reset on any jump. This "internal time" can be treated as the ideal age: All particles display identical (ensemble averaged) dynamics with respect to this time, regardless of their history. In this talk, I will discuss how to decide whether jumps in the single-particle trajectories can be treated as jumps of a CTRW and demonstrate how these events can be utilized to gain history-independent dynamic observables.

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