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Response to a field of the $D = 3$ Ising spin glass with Janus and JanusII dedicated computers¹ BEATRIZ SEOANE, LPT, Ecole Normale Supérieure, JANUS COLLABORATION COLLABORATION² — Using the Janus dedicated computer, and its new generation JanusII, we study the linear response to a field of the Edwards-Anderson model for times that cover twelve orders of magnitude. The fluctuation-dissipation relations are investigated for several values of t_w . We observe that the violations of the fluctuation-dissipation theorem can be directly related to the $P(q)$ measured in equilibrium at finite sizes, although a simple statics-dynamics dictionary $L \leftrightarrow \xi(t_w)$ is not enough to account for the behavior at large times. We show that the equivalence can be easily restored by taking into account the growth of $\xi(t + t_w)$. Interestingly, experimental measurements of the spin glass correlation length rely precisely on the response of a spin glass to a field, although a direct relation between the measured object and the real ξ has never been established. In this work, we mimic the experimental protocol with Janus data, which lets us relate the experimental ξ with the length extracted from the spatial correlation function. These results allow us for the first time to make a quantitative comparison between experiments and simulations, finding a surprising good agreement with measurements in superspin glasses.

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²First results of the new machine JanusII

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