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Scaling and memory effects in the reentrant spin glass phase of nanostructured Mn_xTaS_2[1] PAUL SHAND, JOHN DANKER, XUN XIAO, TIM KIDD, LAURA STRAUSS, University of Northern Iowa — We have investigated the nature of the reentrant spin glass phase of nanostructured Mn-intercalated TaS_2. The sample consisted of bundles of nanoscale fibers with an average atomic concentration of intercalated Mn of 22%. The sample exhibits a ferromagnetic transition at 74 K and a transition to a cluster glass state at 40 K. The ac susceptibility measured in small dc bias fields near the cluster glass transition exhibited scaling behavior, indicating a magnetic-field dependent crossover to glassy dynamics. At temperatures below the cluster-glass transition, the nature of the dynamics was probed by ac susceptibility and zero-field cooled (ZFC) magnetization measurements. Aging and memory effects were observed, consistent with the non-equilibrium dynamics exhibited by glassy magnetic systems. In particular, we probed the ZFC magnetization memory effect as a function of cooling rate, aging time and magnetic field. The behavior is explained in terms of domain growth within the framework of droplet theory.

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