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Nanoscale cluster dynamics in the martensitic phase of Ni-Mn-Sn shape-memory alloys[1] MICHAEL HOCH, SHAOJIE YUAN, PHILLIP KUHNS, ARNEIL REYES, National High Magnetic Field Laboratory, Florida State University, JAMES BROOKS, Department of Physics, Florida State University- Deceased, DANIEL PHELAN, Department of Chemical Engineering and Materials Science, University of Minnesota, VIJAY SRIVASTAVA, RICHARD JAMES, Department of Aerospace Engineering and Mechanics, University of Minnesota, CHRIS LEIGHTON, Department of Chemical Engineering and Materials Science, University of Minnesota — The martensitic phases of Ni-Mn-Sn magnetic shape memory alloys exhibit interesting low temperature magnetic properties, including intrinsic superparamagnetism and exchange bias effects, which have previously been rationalized in terms of spin clusters. We show here that spin-echo NMR, involving ^{55}Mn hyperfine fields, permits ferromagnetic and antiferromagnetic nanoregions to be directly identified in these materials and yields estimates of their size distributions. Nuclear relaxation rate measurements, made as a function of temperature, provide information on both the dynamics and on the electronic structure of the nanoregions. The relaxation rates are analyzed using a combination of Redfield and Korringa mechanisms, the Korringa procedure providing information on the density of states at the Fermi level. Results will be presented for a number of these alloys.

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