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Reentrant and Forward Phase Diagrams of the Anisotropic Three-Dimensional Ising Spin Glass CAN GÜVEN, A. NIHAT BERKER, Koç University, MICHAEL HINCZEWSKI, Technical University of Munich, HIDETOSHI NISHIMORI, Tokyo Institute of Technology — The spatially uniaxially anisotropic d=3 Ising spin glass is solved exactly on a hierarchical lattice.[1] Five different ordered phases, namely ferromagnetic, columnar, layered, antiferromagnetic, and spin-glass phases, are found in the global phase diagram. The spin-glass phase is more extensive when randomness is introduced within the planes than when it is introduced in lines along one direction. Phase diagram cross-sections, with no Nishimori symmetry, with Nishimori symmetry lines, or entirely imbedded into Nishimori symmetry, are studied. The boundary between the ferromagnetic and spin-glass phases can be either reentrant or forward, that is either receding from or penetrating into the spin-glass phase, as temperature is lowered. However, this boundary is always reentrant when the multicritical point terminating it is on the Nishimori symmetry line. [1] C. Güven, A.N. Berker, M. Hinczewski, and H. Nishimori, Phys. Rev. E 77, 061110 (2008).

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