Coexistence of spin density wave and metallic phases under pressure

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Using a simple and rather general model of the system with imperfect nesting of the Fermi surface, we show that the spin density wave (SDW) and normal metal (or, at low temperature, a superconductor) can coexist within a certain pressure range due to the electronic phase separation. The model predicts the SDW state at low pressure, then, nucleation of the paramagnetic (PM) droplets or islands within the SDW host at higher pressure. When the pressure continues to increase, the droplets transform to rods (or pillars) and, finally, to slabs. With the further growth of pressure, a uniform metallic phase arises. The theory agrees well with the experiment and, even in its simplest version, can capture an essential physics of the systems under study.

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