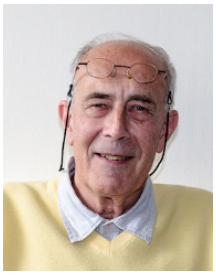

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Disordered structures in ultracold spin-imbalanced Fermi gas

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We investigate the properties of spin-imbalanced ultracold Fermi gas in a large range of spin polarizations at low temperatures. We present the results of microscopic calculations based on mean-field and density functional theory approaches, with no symmetry constraints. At low polarization values we predict the structure of the system as consisting of several spin-polarized droplets. As the polarization increases, the system self-organizes into a disordered structure similar to liquid crystals, and energetically they can compete with ordered structures such as grid-like domain walls. At higher polarizations the system starts to develop regularities that, in principle, can be called supersolid, where periodic density modulation and pairing correlations coexist. The robustness of the results has been checked with respect to temperature effects, dimensionality, and the presence of a trapping potential. Dynamical stability has also been investigated.

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