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Normal State of a Polarized Fermi Gas at Unitarity

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I will discuss the Fermi gas at unitarity and at T=0 by assuming that, at high polarizations, it is a normal Fermi liquid composed of weakly interacting quasiparticles associated with the minority spin atoms. I will show that a quantum Monte Carlo approach can be used to calculate their effective mass and binding energy, as well as the full equation of state of the normal phase as a function of the concentration of minority atoms. We predict a first order phase transition from normal to superfluid at a concentration of 0.44 corresponding, in the presence of harmonic trapping, to a critical polarization of 77 per cent. I will discuss radii and the density profiles of both spin components in the trap and our prediction that the frequency of the spin dipole mode will be increased by a factor of 1.23 due to interactions.