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Orbital order and effective mass enhancement in t_{2g} two-dimensional electron gases JOHN TOLSMA, University of Texas at Austin, ALESSANDRO PRINCIPI, University of Missouri, MARCO POLINI, NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, ALLAN MACDONALD, University of Texas at Austin — It is now possible to prepare d-electron two-dimensional electron gas systems that are confined near oxide heterojunctions and contain t_{2g} electrons with a density much smaller than one electron per metal atom. I will discuss a generic model that captures all qualitative features of electron-electron interaction physics in t_{2g} two-dimensional electron gas systems, and the use of a GW approximation to explore t_{2g} quasiparticle properties in this new context. t_{2g} electron gases contain a high density isotropic light mass xy component and low-density xz and yz anisotropic components with light and heavy masses in orthogonal directions. The high density light mass band screens interactions within the heavy bands. As a result the wave vector dependence of the self-energy is reduced and the effective mass is increased. When the density in the heavy bands is low, the difference in anisotropy between the two heavy bands favors orbital order. When orbital order does not occur, interactions still reshape the heavy-band Fermi surfaces. I will discuss these results in the context of recently reported magnetotransport experiments.

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