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Phases and transport in spin- and mass-imbalanced Fermi mixtures in one dimension BINBIN TIAN, University of Pittsburgh, YUCHI HE, Carnegie Mellon University, MICHELLE TOMCZYK, ANTHONY TYLANTYLER, PATRICK IRVIN, JEREMY LEVY, ROGER MONG, DAVID PEKKER, University of Pittsburgh — We study the interplay of both species (spin and transverse band index) and mass imbalance in a mixture of two or more species of fermions with attractive interactions in one dimension. Previous theoretical and experimental efforts have shown the existence of a Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) phase for the case of two species with equal mass, in addition to the fully paired and fully polarized phases. For the unequal mass case, there are signatures of trimer phases as well. We use DMRG to explore the rich possibilities of quantum phases and their transport signatures for the cases of two and more species of Fermions as we vary the interaction strengths and mass imbalances. With this we can gain insights into ongoing experiments with sketched nanowires in LAO/STO and ultracold atoms confined to one-dimensional tubes.

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