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Exact thermodynamics of the Gaudin-Yang Fermi gas ERHAI ZHAO, XI-WEN GUAN, W. VINCENT LIU, M. T. BATCHELOR, MASAKI OSHIKAWA — We study the thermodynamics of the Gaudin-Yang model, a one-dimensional attractive Fermi gas with spin imbalance recently realized in cold atoms experiments. The exact thermodynamic Bethe ansatz equations are simplified to four algebraic equations in the experimental regime of strong interaction and relatively low temperature. Using the new formulation, we discuss the qualitative features of finite-temperature crossover and make quantitative predictions on the density profiles in traps. These results can help to achieve accurate thermometry for trapped spin-imbalanced Fermi gases with strong interaction.

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