

Abstract Submitted
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Matrix Product States in the continuum: Integrability and beyond CARLOS BOLECH, University of Cincinnati — Building on recent ideas for the formulation of matrix product states in the continuum (cMPS), we have proposed a type of cMPS ansatz that can approximate ground states of interacting spin-1/2 fermions with spin-imbalance in 1D [1]. That system is integrable (Gaudin-Yang) and we showed that cMPS recovers all the expected features of the exact solution and is in good quantitative agreement with it. We now extend that effort to describe a more general system, having both spin- and mass-imbalance. Due to the mass-imbalance, the integrability of the Gaudin-Yang Hamiltonian is lost but we show how the cMPS ansatz continues to perform well in capturing the physics of the system. We also examine the question of different boundary conditions and exploit integrable cases to assess what is the most natural cMPS formulation for studying the thermodynamic limit of this type of problems [2].

- [1] S. S. Chung and C. J. Bolech, Phys. Rev. B 91, 121108(R) (2015)
- [2] Z. Mei and C. J. Bolech, arXiv:1609.08045

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