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High-momentum tail and universal relations of a Fermi gas near a Raman-dressed Feshbach resonance FANG QIN, Key Laboratory of Quantum Information, University of Science and Technology of China, JIANWEN JIE, Department of Physics, Renmin University of China, WEI YI, GUANG-CAN GUO, Key Laboratory of Quantum Information, University of Science and Technology of China — In a recent proposal [Jie and Zhang, Phys. Rev. A 95, 060701(R) (2017)], it has been shown that center-of-mass-momentum-dependent two-body interactions can be generated and tuned by Raman-coupling the closed-channel bound states in a magnetic Feshbach resonance. Here we investigate the universal relations in a three-dimensional Fermi gas near such a laser modulated s-wave Feshbach resonance. Using the operator-product expansion approach, we find that, to fully describe the high-momentum tail of the density distribution up to q^{-6} (q is the relative momentum), four center-of-mass-momentum-dependent parameters are required, which we identify as contacts. These contacts appear in various universal relations connecting microscopic and thermodynamic properties. Particularly, we find that the q^{-5} tail and part of q^{-6} tail of the momentum distribution show anisotropic features. We derive the universal relations, and, as a concrete example, estimate the contacts for the zero-temperature superfluid ground state of the system using a mean-field approach.

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