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Contact of dilute atomic Fermi gases with spin-orbit couplings ZHENHUA YU, Institute for Advanced Study, Tsinghua University — We study the contact of three dimensional spin half dilute atomic Fermi gases with spin-orbit couplings. The interatomic interaction is modeled by the contact pseudopotential. In the high temperature limit, we derive the expression for the second virial expansion of the thermodynamic potential via the ladder diagrams. When the spin-orbit couplings are small, we show that the contact between the fermions increases as the fourth power of the couplings. At zero temperature, we consider the cases where there are symmetric spin-orbit couplings in two or three dimensions. In the dilute limit, the system consists of condensed bosonic molecules; we find that the contact also becomes bigger compared to that in the absence of spin-orbit couplings. Our results indicate that generically spin-orbit couplings enhance the contact of the Fermi gases. Such enhancement can be measured via photoassociation.

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