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Abstract for an Invited Paper
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George E. Valley, Jr. Prize Talk: Exact relations for Fermi gases with large scattering length¹

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Ultracold two-component atomic Fermi gases near broad Feshbach resonances have both strong interactions and relatively long life times, and the strong attractions between fermions lead to remarkable properties such as superfluidity at large percentages of the Fermi temperature. The interactions can often be described by a single parameter, the two-body *s*-wave scattering length, which determines how the many-body wave function behaves as two atoms get much closer than the average interparticle spacing. This short-range structure of the wave function leads to a number of exact relations among energy, momentum distribution, pressure, and various high-frequency and short-wave properties. All the relations involve a quantity called contact. The exact relations point to a number of independent determinations of the contact, which have been beautifully demonstrated experimentally as well as numerically.

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