The resonant Fermi gas, $i.e.$ two-component fermions in 3D interacting by a short-range potential of large scattering length a_2 , is a textbook model describing cold atoms near a Feshbach resonance.

A key quantity is the 2-body contact C_2 , which determines $e.g.$ the number of nearby fermion pairs, the tail of the single-particle momentum distribution, or the derivative of the energy with respect to a_2 .

At the unitary limit $a_2 = \infty$, scale invariance and $SO(2,1)$ dynamical symmetry ($i.e.$ non-relativistic conformal invariance) imply a non-trivial power-law scaling of the 3-body wavefunction at short distances. This allows us to introduce the 3-body contact C_3 , in terms of which we express $e.g.$ the number of nearby fermion triplets, or the large-momentum tail of the two-particle momentum distribution. In the experimentally relevant case of a finite-range interaction, we express the formation rate of deeply bound dimers by 3-body recombination in terms of C_3 and a parameter a_3 defined through the asymptotic behavior of the 3-body wavefunction at intermediate distances [1].

In the thermodynamic limit, we compute C_3 to leading order in the non-degenerate limit [2], and we propose a procedure to experimentally determine C_3 in the degenerate regime where computing C_3 is an open theoretical challenge.

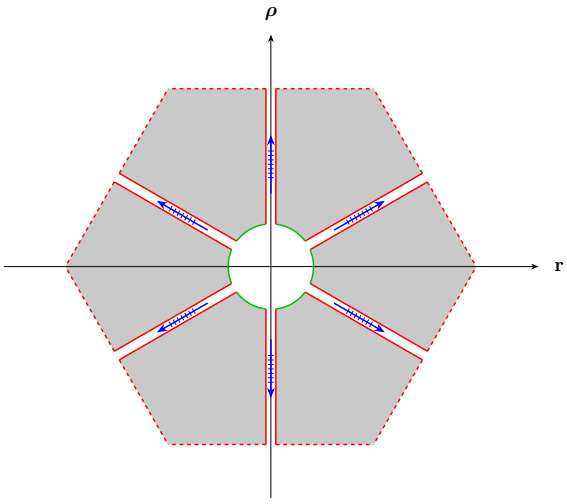

Figure 1: Geometric illustration of the 3-body loss process.

[1] FW and X. Leyronas, Comptes Rendus Physique **25**, 179 (2024)

[2] X. Leyronas and FW, *in preparation*