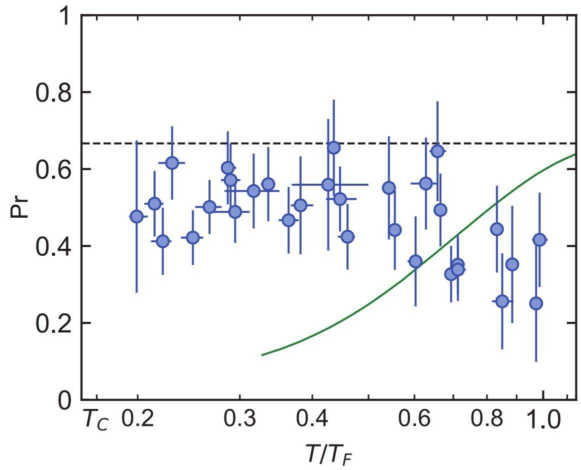

Figure 5-6: **Prandtl number.** The Prandtl number $\mathrm{Pr} = c_P\eta/\kappa$ calculated from transport properties shown in Fig. 5-5. While η and κ deviate from their high-temperature and Fermi-liquid predictions at low-temperatures, their ratio Pr remains close to its high-temperature value 2/3 [25, 56]. A theoretical prediction is shown, green line [56].

conductivity is observed to be much smaller than expected [110], indicating that in presence of strong interactions charge and heat might propagate independently. The breakdown Wiedemann-Franz law was also observed in two reservoirs of the unitary Fermi gas connected via very small one-dimensional channel [86], where they measured a Lorentz number about factor of 10 smaller than expected.

In typical gases, the same underlying particles transport both momentum and heat, resulting in the ratio $c_P\eta/\kappa \equiv \mathrm{Pr}$, known as the Prandtl number, to remain approximately constant. Most gases feature a Prandtl number close to 2/3 [170] while its value in viscous liquids, like glycerol, can be orders of magnitude higher. The extracted values of Pr are shown in Fig. 5-6. Even through the two transport properties deviate significantly from both the high-temperature and Fermi-liquid predictions, their ratio, the Prandtl number $\mathrm{Pr} = c_P\eta/\kappa$, remains approximately constant and close to its high temperature value of 2/3. This indicates that even though the strongly interacting Fermi gas isn't described by well defined quasi-particles, the transport of both momentum and heat is carried out by the same underlying mechanism. A similar behavior is observed in the pseudogap phase of high-temperature cuprate superconductors [126]. There, the electrical conductivity displays a $1/T$ de-