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Anisotropic Shear Viscosity in trapped ultracold Fermi Gases

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Abstract： I will present a proposal to measure anisotropic shear viscosity in a strongly interacting, ultra- cold, unitary Fermi gas confined in a harmonic trap. We introduce anisotropy in this setup by strongly confining the gas in one of the directions with relatively weak confinement in the remaining directions. This system has a resemblance to anisotropic strongly coupled field theories studied in the context of gauge-gravity duality. Computations in such theories revealed that some of the viscosity components of the anisotropic shear viscosity tensor can be made much smaller than the entropy density, thus parametrically violating a limit proposed by Kovtun, Son and Starinets (KSS): η/s ≥ 4π. A Boltzmann analysis performed in a system of weakly interacting particles in a linear potential also shows that components of the viscosity tensor can be reduced. Motivated by these exciting results, we proposed two hydrodynamic modes in the unitary Fermi gas whose damping isgoverned by the component of shear viscosity expected to violate the KSS bound. Finally, I will mention some work on anisotropic shear viscosity in a slightlydifferent context: in FF phases in the cores of neutron stars.

Aboutspeaker： Rishi Sharma obtained his BS at Indian Institute of Technology, Bombay, India in 2002, and his PhD at the Center for Theoretical Physics of MIT in 2007. Subsequently he did postdocs at Los Alamos National Lab in the USA and Canada's particle accelerator (TRIUMF) in Vancouver, respectively. Since 2013 he has been a faculty member in the department of theoretical physics of Tata Institute of Fundamental Research (TIFR) in Mumbai, India. Currently he is an associate professor in TIFR, and his research focuses on the properties of matter at high densities and/or high temperatures.

时间：11月14日（星期四）15:00—16:40

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