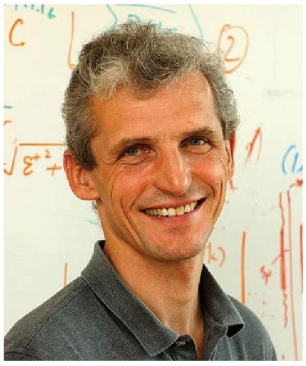
yale SPS society of physics students

THE SECOND ANNUAL
TINSLEY SENIOR PRIZE LECTURE

DECEMBER 5, 2019
reception: SPL 3rd floor @ 4:00
talk: SPL 59 @ 4:30



OPEN TO THE PUBLIC
ALL ARE WELCOME!

Wolfgang Ketterle
2001 Nobel Laureate in Physics
MIT

Ultracold atoms: From superfluid gases to spin transport

The realization of Bose-Einstein condensation in dilute atomic gases has created a unique experimental platform to study superfluidity in Bose and Fermi gases. The low density (a million times lower than air) of the gas allows control over the atoms and their interactions using the tools and precision of atomic physics. For fermions, the crossover from Bose-Einstein condensation of strongly bound fermion pairs to weakly bound Cooper pairs has been explored. After freezing out the motion of atoms, control of the spin degree of freedom has emerged as a new frontier. I will report on recent results on spin transport in optical lattices which highlights the crucial role of the anisotropy in the paradigmatic Heisenberg Hamiltonian. These studies illustrate a new approach to condensed-matter physics where many-body phenomena are realized in dilute atomic gases.