

PLASMA PHYSICS SEMINAR

WHEN & WHERE

Monday, February 10, 2020
1:30 p.m. | 309 VAN

SPEAKER



Professor Jack Scudder
Department of Physics & Astronomy
University of Iowa

TITLE

“The Closure Problem for Astrophysical Plasmas”

ABSTRACT

Models relevant to the mystery of the coronal temperature inversion or the support of the solar wind expansion are necessarily performed on the fluid scale. Fluid scale approximations require closures to make the equations finite in number. Once introduced the approximations necessary to derive the closures have been forgotten and research effort has focused on the implications of the solutions of the fluid equations. The published conclusions of 5 well known (including some modern) modeling thrusts of this type are shown to be internally contradictory of their closure assumptions, vacating their results that many paraphrase as ‘well known’ or ‘incontrovertible’. These invalid conclusions have been heralded by many for over 60 years without critique. 5 a posteriori tests for these inconsistencies can be produced from the fluid solutions. Nearly the entire family of commonly used closure approaches for these systems is demonstrated to be inappropriate, leaving fluid scale descriptions for them at an impasse. A brief but general description of plasmas in the astrophysical condition highlights the cause for this impasse.