TRANSPORT THEORY: MICROSCOPIC REVERSIBILITY
AND SYMMETRY

K. Molvig and K. Hizanidis
Plasma Fusion Center
Massachusetts Institute of Technology

ABSTRACT

The general theory of Fokker-Planck equation symmetries and their relation to derived transport theory symmetries is developed. The property of microscopic reversibility implies a symmetry in the Fokker-Planck equation for processes obeying detailed balance. It is shown that this symmetry is not sufficient to guarantee Onsager reciprocity for the full matrix of transport coefficients. The general transport matrix has broken symmetry. A partial symmetry can be identified. The theory is compared to the different formulation given by Onsager.