APS Colloquium

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APS Auditorium, Building 402, Argonne National Laboratory
APS Colloquium home

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Liquid-Vapor and Metal-Nonmetal Transition in Metals

Fluid metals are typical examples of materials whose electronic structures depend strongly on the thermodynamic state of the system. The most striking manifestation of this state dependence is the metal-nonmetal transition which occurs when the dense liquid evaporates to the dilute vapor, or when the fluid is expanded by heating to its liquid-vapor critical point. Experiments that investigate how the properties of fluid metals vary with temperature and density reveal that the very existence of this transition noticeably influences the electronic, thermodynamic, structural, dynamic and interfacial features of the fluid.

Dr. Dr. Friedrich Hensel has been a Professor of Physical Chemistry at the Philipps-University of Marburg, Germany, since 1975. He received his PhD in Physical Chemistry from the University of Karlsruhe, Germany (1966) and received an Honorary Doctorate from Humboldt-University, Berlin (1999). He has held Guest Professor positions at the University of Tel-Aviv, Isreal, the University of Kyoto, Japan, Tohoku University, Japan, and the University of Illinois, Urbana-Champaign (1987). Dr. Hensel was Director of the Institute of Physical-, Nuclear and Macromolecular Chemistry from 1997 to 2000. He has served on the editorial boards of both *Philosophical Magazine* and *Zeitschrift fur Physikalische Chemie* (International Journal of Research in Physical Chemistry).

Dr. Hensel's research interest is in Chemical Physics, bridging the gas and condensed phases. He has made contributions in a number of areas in the physics and chemistry of electronically conducting fluids: Electronic properties of small metal-clusters and molecular clusters, fluid metals and semiconductors in the liquid-vapor critical region, nucleation phenomena, properties of liquid alloys, and wetting phenomena.

Friedrich Hensel's introductory text, *Fluid Metals: The Liquid-Vapor Transition of Metals* (Princeton U. Press, 1999), with co-author William W. Warren, Jr., on the physics and chemistry of the liquid-vapor phase transition of metals, bridges the conceptual gap between the condensed-matter physics relevant to a dense metallic liquid and the molecular chemistry relevant to a dilute atomic vapor.
