



Wednesday
October 7, 2026
3:10 pm
Room 1003 EECS

Dr. Charles Starrett

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Material Properties Inside Stars and Fusion Plasmas

Accurate simulations of fusion experiments or astrophysical objects like stars need material data such as equation of state, opacity and particle transport coefficients of matter under extreme conditions. This means we need to understand how matter behaves when it is very hot (10,000 to 100,000,000 K) and at high density (1 to 1,000,000 g/cm³). In this regime, atoms are partially ionized and significantly overlap, meaning that the usual low-density plasma physics methods are inaccurate. In our research group at Los Alamos National Laboratory, we have developed methods to accurately model these plasmas. In this talk I will review the progress we have made and some of the major outstanding challenges in this rapidly developing field.

About the Speaker: Dr. Charles Starrett received his PhD from the Queen's University of Belfast in 2007, where he worked on positronium collisions with matter. He went from there to a postdoctoral position at the French Alternative Energies and Atomic Energy Commission (CEA), where he began to study the structure of matter in warm and hot dense plasmas. In 2010 he joined Los Alamos National Laboratory to continue this work and still works in this field today. He has developed models to predict material properties such as equation of state, particle transport and opacity for applications ranging from fusion to astrophysics.