UNL Department of Physics and Astronomy presents:

Atomic and Molecular Collisions: What are they, What are they good for, and How do we calculate them

PRESENTED BY
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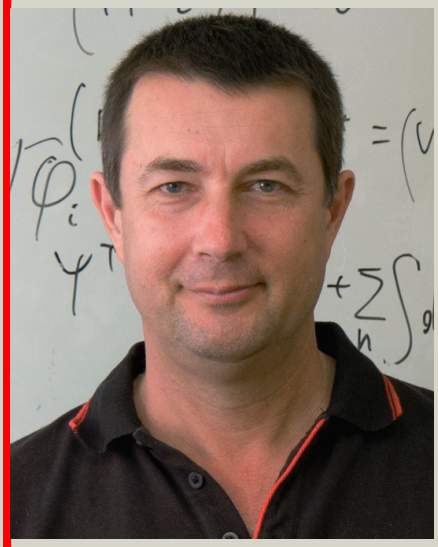

THURSDAY
NOVEMBER 11
4:00 PM
VIA ZOOM

Refreshments will be served in the JH 1st Floor Vending Area at 3:30

ABSTRACT

Collisions on the atomic scale are ubiquitous in the Universe. Consequently, there is no shortage of applications that benefit from their quantitative understanding. These range from fusion energy and antihydrogen formation through to medical imaging and therapy. Despite their utility even their mathematical formulation proved to be particularly problematic. Governed by the Laws of Quantum Mechanics we require a unitary (probability conserving) formalism even when there are infinite possible outcomes. Requiring antisymmetric wavefunctions can lead to non-unique solutions. The long-ranged nature of the Coulomb potential means that in breakup collisions we typically have three charged particles interacting out to infinite distances. The convergent close-coupling (CCC) method was developed to address these problems. In the presentation we shall explain the collision systems of interest, their applications, and the computational techniques of their solution. Most unusually, the computational success has led to a reformulation of Quantum Collision Theory that is equally valid for short- and long-ranged potentials.