

Abstract Submitted  
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**Properties of Water/Gold Nanofluids<sup>1</sup>** GIANLUCA PULITI, SAMUEL PAOLUCCI, MIHIR SEN, University of Notre Dame — Nanofluids belong to a new class of fluids with enhanced thermophysical properties and heat transfer performance. A broad spectrum of applications in science and engineering can potentially benefit from their use. However, the physical explanation for this enhancement is still lacking. The novelty of this work is in a fundamental, realistic, and comprehensive approach to the problem of understanding nanofluids through the use of molecular dynamics simulations with accurate potentials to model realistic materials. Specifically, this study treats the case of water confined between gold nanolayers to examine interfacial interactions and a water-based nanofluid with spherical gold nanoparticles. Thermodynamics and transport properties will be discussed for both systems. It is interesting to note that while the thermodynamic properties of the mixture are typically predicted using ideal mixture theory, such predictions are found to be generally poor for nanofluids. The anisotropy induced by the gold-water interface, and its effects appear to be responsible for the disagreement. We will also discuss the role of interfacial effects on the anomalous enhancement of nanofluid transport properties.

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