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Numerical Studies of Friction Between Metallic Surfaces and of its Dependence on Electric Currents[1] EVANGELOS MEINTANIS, MICHAEL MARDER, Center for Nonlinear Dynamics, The University of Texas at Austin — We will present molecular dynamics simulations that explore the frictional mechanisms between clean metallic surfaces. We employ the HOLA molecular dynamics code to run slider-on-block experiments. Both objects are allowed to evolve freely. We recover realistic coefficients of friction and verify the importance of cold-welding and plastic deformations in dry sliding friction. We also find that plastic deformations can significantly affect both objects, despite a difference in hardness. Metallic contacts have significant technological applications in the transmission of electric currents. To explore the effects of the latter to sliding, we had to integrate an electrodynamics solver into the molecular dynamics code. The disparate time scales involved posed a challenge, but we have developed an efficient scheme for such an integration. A limited electrodynamic solver has been implemented and we are currently exploring the effects of currents in the friction and wear of metallic contacts.

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