

**CRUNCH Seminars at Brown, Division of Applied Mathematics**

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**Neural Network Method for solving parabolic two-temperature microscale heat conduction in double-layered thin films exposed to ultrashort-pulsed lasers**

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**Simulation of the micro/nanoscale heat conduction induced by ultrashort-pulsed laser heating has been attracting great attention. Additionally, machine and deep learning techniques are becoming an important tool in engineering and science research. This article presents an artificial neural network (ANN) method for solving the parabolic two-temperature heat conduction equations in double-layered thin films exposed to ultrashort-pulsed lasers. The convergence of the ANN solution to the analytical solution is theoretically analysed. Finally, the ANN method is used to predict the electron and lattice temperatures in a gold film padding on a chromium film when exposed to ultrashort-pulsed lasers, which is based on the parabolic two-temperature heat conduction model.**