

COLLOQUIUM

Department of Physics

Traffic Waves, Autonomous Vehicles, and the Future of Traffic Modeling

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Abstract

Via analysis and simulations of traffic flow models, we demonstrate that stop-and-go waves in vehicular traffic flow can arise from instabilities, caused by the collective driving dynamics of the humans on the road. Moreover, these nonlinear waves are mathematical analogs of detonation waves. We then use these models to study the near future, in which a few connected and automated vehicles (CAVs) will be immersed in the traffic stream. We present theoretical as well as experimental results that show how a small number of CAVs can be employed for future traffic flow control to dissipate, and even prevent, traffic waves. We close with an outlook on how traffic flow on our roadways is about to change fundamentally, and how this will greatly affect traffic modeling at the interface of applied mathematics, physics, and engineering.

Monday, April 23, 2018 at 3:00 pm

SERC, Room 116

Refreshments will be served at 2:45 pm