

Michigan Math Club

Thursday at 4pm in the Nesbitt Room
Free Pizza and Pop

Nature's most important force –
buoyancy

Charlie Doering • 17 October 2019

Buoyancy forces in fluids, i.e., liquids or gasses, result from density variations in the presence of gravity. The most familiar example of this is the ubiquitous observation that "heat rises" because warmer fluid is (usually) less dense than cooler fluid.

Buoyancy is not a fundamental force of nature – rather, it emerges as a complex interplay fundamental forces – but it is arguably the most important force of nature on scales larger than ourselves. Indeed, nature employs buoyancy forces to make the wind blow, which in turn make the oceans flow. Buoyancy drives continental drift, and the earth's magnetic dynamo.

In this talk we present a minimal mathematical model of buoyancy driven fluid flow and describe some of the challenges it presents for theoretical analysis and scientific computation.

