

Ouroboros

University of Colorado, Boulder
Advisors: Mark Hoefer, Michelle Maiden

March 4, 2017

Will Farmer
www.will-farmer.com



High Level Overview

Can we make a soliton gas?

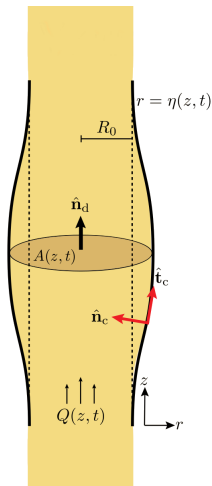
- One-Dimensional Fluid System
- Solitons (and other discrete structures) possible
- Need to use some statistics...



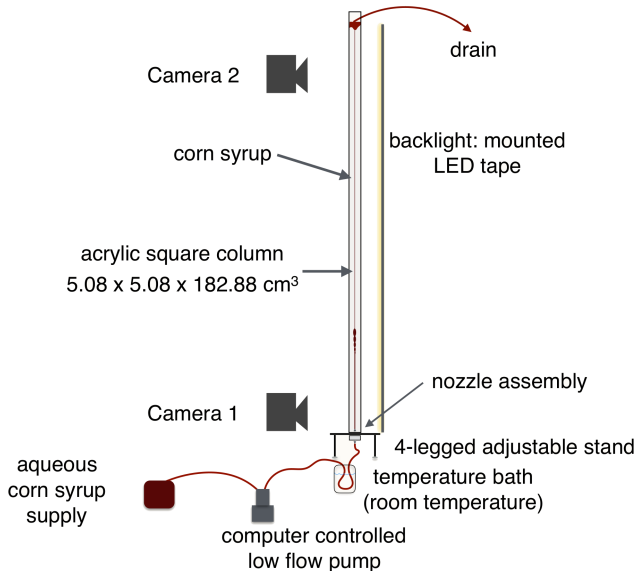
What's our Environment?

Viscous Fluid Conduits

- Two viscous fluids, with inner forming axisymmetric conduit.
- Exterior Fluid: $\rho^{(e)}$ density and $\mu^{(e)}$ viscosity
- Interior Fluid: $\rho^{(i)}$ density and $\mu^{(i)}$ viscosity
- $\rho^{(i)} < \rho^{(e)} \Rightarrow$ buoyant flow
- $\mu^{(i)} \ll \mu^{(e)} \Rightarrow$ minimal drag
- $Re \ll 1 \Rightarrow$ low Reynold's number



Experimental Setup



What's a Soliton Gas?

Let's break it down into its components.

Soliton

Soliton



Numerical Simulations



Leveraging Parallelism



Preliminary Results



Acknowledgements

- Mark Hoefer
- Michelle Maiden
- Funded by NSF EXTREEMS-QED

