Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

**Analysis of Peristaltic Mixing and Transport Processes in the GI Tract** SREEDEVI KRISHNAN, The University of Iowa, SETH DILLARD, H.S. UDAYKUMAR, COMPUTAIONAL THERMAL/FLUIDS GROUP TEAM — Nutrient absorption, mixing and breakdown takes place in the GI tract in the laminar flow regime by the action of peristaltic contraction waves. Several engineering applications demand effective methods for mixing of fluids of varying consistency. Adopting the physiological system as a model for the design of optimal mechanical systems requires full understanding of the physics involved. An Eulerian Levelset based sharp interface method with Lagrangian particle tracking is used to perform detailed computational analysis of the flow, transport and mixing in a model intestine under the action of peristaltic waves. Mixing is quantified by mixing measures, mixing maps, stretch rates and rotation rates. Results show complex dynamics of mixing by action of moving walls, vortex formation and shedding. Insights are obtained into the fluid mechanics in the gastrointestinal tract over a wide parameter space influencing mixing and transport, including particle size, mass, initial placement of the bolus, frequency and amplitude of the peristaltic wave and wave train effects.

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Date submitted: 28 Jul 2005 Electronic form version 1.4