

## **Topics to be Covered by Prof. Balsara at the LesHouches Workshop on Computational Astrophysics**

- 1) Introduction to Hyperbolic Systems in Computational Astrophysics – The Big four – Euler equations; classical MHD; Relativistic Hydrodynamics; Relativistic MHD
- 2) von Neumann Stability Analysis – The problem with Advection
- 3) Linear Advection and Linear Hyperbolic Systems
- 4) Non-Linear Conservation Laws – Introduction to the Riemann Problem
- 5) Riemann Solvers I
- 6) Riemann Solvers II
- 7) Second Order Schemes for the Big Four Hyperbolic Systems in Computational Astrophysics
- 8) Higher Order Schemes for the Same
- 9) Multidimensional Riemann Solvers and Divergence-Free MHD and RMHD
- 10) Adaptive Mesh Refinement and AMR-MHD