







ERIK WESSEL

SCALE 22X



BINARY BLACK HOLE GRAND CHALLENGE

- 3D codes simulating black holes are a huge challenge
 - Large computational grids & short time-steps
 - Advanced CFD techniques
 - Parallelism & adaptive meshes needed
- NSF “Grand Challenge” funding brings multidisciplinary teams together
- 3D Black Holes are simulated...
... but they all crash!



UNEXPECTED PROBLEMS (1993-2005)

- All simulations of binary black holes are numerically unstable
- No one knew why!
 - Issues with handling BH singularities?
 - Issues with coordinate choices?
 - Instabilities in the formulation of Einstein's Equations?
- Must implement many approaches to see what works