GRAVITATIONAL WAVES
SOLVING EINSTEIN’S EQUATIONS

- http://einstein-toolkit.org/

Binary black hole GW150914
PARTICLE PHYSICS

ATLAS

CMS

A Compact Solenoidal Detector for LHC
Monte Carlo Event Generators

- **Hard interaction**
  exact matrix elements $|\mathcal{M}|^2$

- **QCD bremsstrahlung**
  parton showers in the initial and final state

- **Multiple Interactions**
  beyond factorization: modelling

- **Hadronization**
  non-perturbative QCD: modelling

- **Hadron Decays**
  phase space or effective theories

⇒ stochastic simulation of pseudo data
⇒ fully exclusive hadronic final states
⇒ direct comparison with experimental data, e.g., ATLAS, CMS, LHCb, DØ, CDF

modulo detector simulation
CAMPUS RESOURCES

• High Performance Computing Center (HiPeCC) is coming soon.
• Physics has various computers (contact group leaders).
• Beocat is the High-Performance Computing (HPC) cluster at Kansas State University. It is run by the Institute for Computational Research in Engineering and Science, which is a function of the Computer Science department. Beocat is available to any educational researcher in the state of Kansas (and his or her collaborators) without cost. Priority access is given to those researchers who have contributed resources.

• Get an account at: https://beocat.ksu.edu

• Support pages at: https://support.beocat.ksu.edu/BeocatDocs/index.php/Main_Page
OPEN SCIENCE GRID

- [https://opensciencegrid.org](https://opensciencegrid.org)
- Help at [https://support.opensciencegrid.org/support/home](https://support.opensciencegrid.org/support/home)
XSEDE: EXTREME SCIENCE AND ENGINEERING DISCOVERY ENVIRONMENT

- XSEDE is a single, virtual cyberinfrastructure that scientists use to interactively share computing resources, data, and expertise. XSEDE resources may be broadly categorized as follows: High Performance Computing, High Throughput Computing, Visualization, Storage, and Data Services. Many resources provide overlapping functionality across categories. For more information visit the list of XSEDE resources.

- https://youtu.be/PBUlBJHZzD4
- https://www.xsede.org/web/site/for-users/getting-started
- https://portal.xsede.org/documentation-overview#discover-campuschampions

- Allocation is available via the Campus Champion for WSU (That’s me.)
The mission of the National Energy Research Scientific Computing Center (NERSC) is to accelerate scientific discovery at the DOE Office of Science through high performance computing and data analysis.

NERSC is the principal provider of high performance computing services to Office of Science programs — Magnetic Fusion Energy, High Energy Physics, Nuclear Physics, Basic Energy Sciences, Biological and Environmental Research, and Advanced Scientific Computing Research.

- [http://www.nersc.gov](http://www.nersc.gov)
- [http://www.nersc.gov/users/getting-started/](http://www.nersc.gov/users/getting-started/)