

DOE
High Energy Physics
Particle Astrophysics Experiments

AAAC Meeting
February 18, 2009

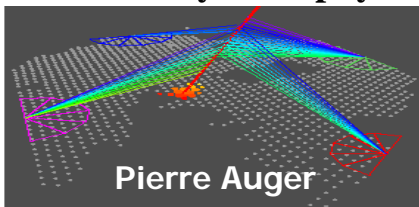
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Department of Energy

DOE HEP is involved in on-going, planned and proposed Particle Astrophysics experiments

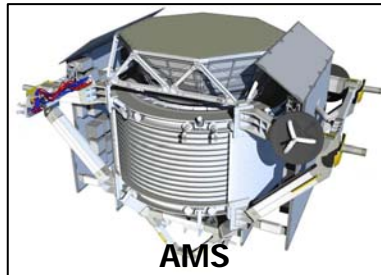
Gamma-ray Astrophysics



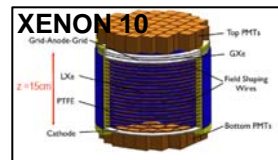
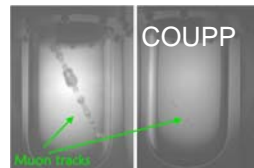
Cosmic Ray Astrophysics



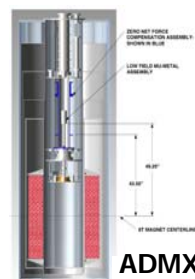
Anti-matter, Dark Matter



Dark Matter (WIMPs)



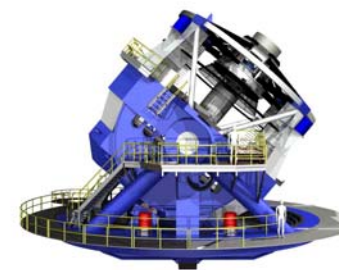
Dark Matter (axions)



Dark Energy Ground-based



(LSST)



Dark Energy Space-based



Dark Matter Searches

Cryogenic Dark Matter Search (CDMS-II)

w/NSF

- Direct detection of WIMPs with ultracold Ge in Soudan Mine
- Data-taking: Full operations with 5 towers (~5kg active mass)
- New proposal for a next generation experiment is expected soon

Axion Dark Matter Search (ADMX) experiment

- At Lawrence Livermore National Lab
- Phase I upgrade completed in 2008 – using SQUID amplifiers
- Data taking in 2008 – 2009; upgrade proposal expected

Large Underground Xenon (LUX) dark matter experiment

w/NSF

- Two phase 100 kg. fiducial liquid-gas Xenon time projection chamber
- In SUSEL underground lab – delayed by water in Homestake Mine
- Data taking expected in 2009 (WIMP search)

Chicago and Observatory for Underground Particle Physics (COUPP) w/NSF

- 2 kg refrigerant bubble chamber to detect low energy nuclear recoils
- currently being upgraded to 60kg (WIMP search)

Evaluating other technologies for future as recommended by our Dark Matter Science Assessment Group (DMSAG)

