

Commentary from High Energy Physics Laboratories: Brookhaven National Laboratory

**Presented to the
High Energy Physics Advisory Panel**

**by
Thomas B.W. Kirk
Associate Laboratory Director HENP
Brookhaven National Laboratory**

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Highlights from the BNL HEP Program

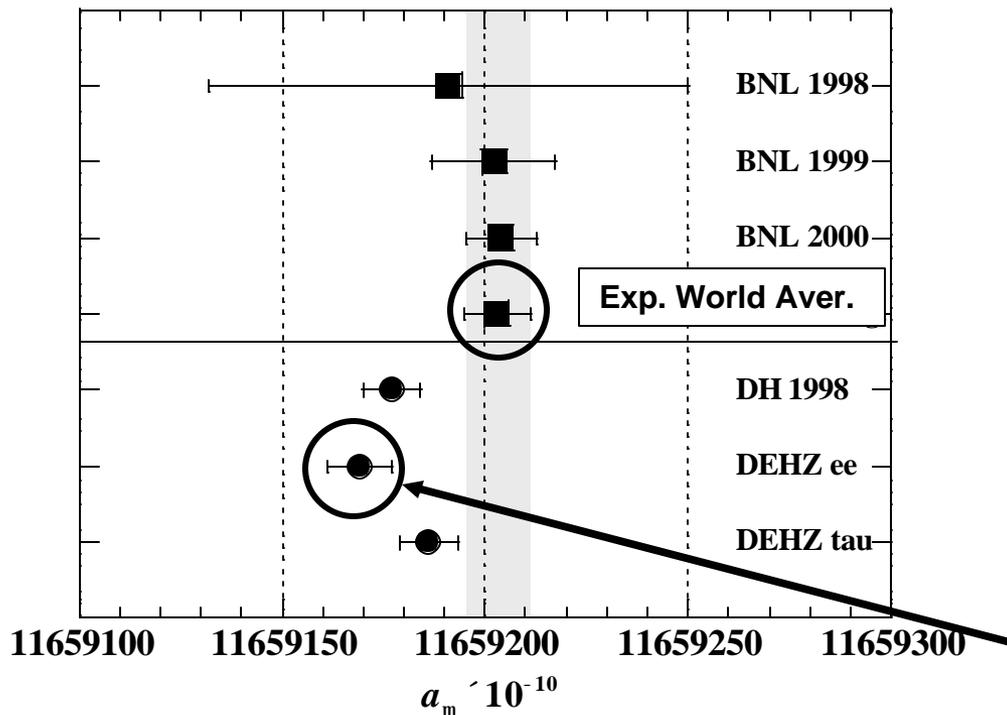


- **Dr. Ray Davis**, retired BNL Chemist, won the 2002 Nobel Prize in Physics for his 3 decade long experiment to measure the flux of solar neutrinos. The citation for this prize read: *“for pioneering contributions to astrophysics, in particular for the detection of cosmic neutrinos”*
- the Muon (g-2) experiment at BNL published a new result in August 2002 that lowered the experimental error by a factor of 2 to the level of 0.7 ppm. **The current result differs from theory by 3.0 s if e⁺e⁻ results are used for comparison and by 1.6 s if tau decays are used.** In Italy, the KLOE experiment has gotten first results that are consistent with the e⁺e⁻ solution. This could be the first clear experimental indication of physics beyond the SM [SUSY with large tan(β)].

Muon (g-2) August 2002 New Result

Courtesy of Prof. David Hertzog, Univ. of Illinois at Urbana-Champaign

Comparison of Experiment and Theory



DH 1998 by Davier and Höcker with older e^+e^- data, first use of tau and pQCD at high energies for 1st-order hadronic vacuum polarization contribution. This was “the standard” analysis. Signs of hadronic light-by-light have been corrected.

DEHZ ee, is new 2002 summary by Davier, Eidelman, Höcker and Zhang using with **only e^+e^-** data including latest final Novosibirsk results (See: hep-ph/0208177)

DEHZ tau, is same summary but using **only tau** data including new data.

DEHZ ee is 3.0 s from experiment;

DEHZ tau is 1.6 s from expt.

FY03 BNL Budget Status

B&R (KA)	Brief Title	FY02 (\$M)	FY03PB (\$M)	FY03CR (\$M)	Staff02* (FTE)	Staff03* (FTE)	DStaff (FTE)
110102	Phys Res	7.5	7.1	7.3	45.9	35.6	-10.3
1102041	LHC Accel	1.9	1.7	1.5	41.1	30.8	-10.3
1102043	ATLAS Det	2.0	0.4	1.2	15.0	12.5	- 2.5
1102051	LHC Comp	1.2	0.7	0.3	6.9	6.9	0.0
110206	AGS Ops	6.0	0.0	0.0	22.1	0.0	-22.1
140102	Theory	2.5	2.4	2.3	11.2	9.8	- 1.4
150102	Accel Res	1.9	2.1	1.8	41.1	30.8	-10.3
150201	Gen Accel Dev	1.0	2.1	0.9	8.3	7.9	- 0.4
150203	Muon Accel	1.6	1.0	1.0	5.7	3.6	- 2.1
150302	Det Develop	0.9	0.8	0.9	5.3	4.8	- 0.5
Total Operations		26.5	18.3	17.2	202.6	142.7	-59.9
Percent Change				-35%			-30%
Total Eqp/Constr		12.6	6.3	6.4			
Percent Change				-50%			

* Staff FTE paid with Equipment Funds are combined with the Operations staff totals

FY03 Budget Impacts at BNL

- **Important frontier HEP experiments at AGS are terminated**
 - Muon (g-2) no final data run to reach its sys. error limit « **SUSY evidence?**
 - E949 [$K^+ \rightarrow \pi^+ \nu \bar{\nu}$] halted after good start in FY02 « **CP-Viol in kaon sys**
- **BNL HEP staff must be cut by 30% from FY02 levels**
 - overall HEP program is devastated by funding shrinkage exacerbated by inflation
- **U.S. leadership in the ATLAS Computing & Physics program is threatened**
 - LHC Computing funding down from U.S. ATLAS plan « **loss of U.S. leadership?**
- **Accelerator and SC Magnet R&D will continue to stagnate at BNL**
 - recent DOE Review of SC Magnet R&D was laudatory; modest funding provided
 - the future of BNL contributions to LC R&D is in doubt by funding problems
- **BNL contributions to high-priority U.S. HEP experiments must be cut**
 - DOE suggests BNL reconsider its participation in MINOS/CKM
 - hard commitments to D0 & ATLAS will be met with top priority
 - all other HEP work will be cut by ~50%

Commentary

- **Rhetoric is not Funding**

- Secretary Abraham's BNL speech touted the importance of science for DOE
- Congress passed a doubling resolution but not the FY03 appropriation bills
- PCAST urges increased funding for physical sciences; 'doubling' was edited out
- OMB continues to oppose needed increases for the physical sciences

- **Mission is not Entitlement**

- all policy sectors agree the U.S. must support the mission of basic science
- basic research needs a steady, sustained level of funding to succeed
- peer review is used to prioritize research support; this is *not an entitlement*

- **Policy is not Management**

- Bush Administration policy is "Performance will be rewarded"
- DOE is rewarding good performance with constant-dollar budget cuts each year

- **Goals are not Performance**

- good science requires successful performance as well as thoughtful goals
- funding is not well correlated with the policy of "Performance will be rewarded"