Curriculum Vitae

Barry C. Barish
Linde Professor of Physics
California Institute of Technology
Pasadena, CA 91125 USA

Director, LIGO Laboratory

Academic Positions

Linde Professor of Physics	California Institute of Technology - 1991-present
Professor of Physics	California Institute of Technology - 1972-1991
Associate Professor	California Institute of Technology - 1969-1972
Assistant Professor	California Institute of Technology - 1966-1969
Research Fellow	California Institute of Technology - 1963-1966
Research Fellow	University of California, Berkeley - 1962-1963

Education

Ph.D.	University of California, Berkeley	1962
BA	University of California, Berkeley	1957

Awards

Member, National Science Board (NSB) 2003-2009
Member, National Academy of Science (NAS)
Fellow, American Association for the Advancement of Science (AAAS)
Klopsteg Award for 2002, American Association of Teachers (AAPT)
Fellow, American Physical Society (APS)
Maxine and Ronald Linde Professorship

Recent Lectures (Selected)

VIRGO Inauguration (Cascina, Italy) – Invited Speaker	2003
Lawrence Berkeley National Laboratory – Invited Speaker	2003
NAS NRC Meeting (Washington DC) – Invited Speaker	2003
Pennsylvania State University – Colloquium Speaker	2003
Los Alamos National Laboratory – Director's Colloquium	2003
Caltech Watson Lecture – Invited Speaker	2003
AAAA Annual Meeting (Denver, Colorado)	2003
Klopsteg Memorial Lecture at 125th AAPT Meeting	2002
AIP Conference (Sydney, Australia) – Plenary Speaker	2002
Tribute to Hanbury Brown – AIP Conference – Invited Speaker	2002
HEPAP Subpanel Meeting (Washington DC) – Invited Speaker	2002

Recent Membership: Committees and Panels (Selected)

Laser Interferometer Gravitational-wave Observatory (LIGO)
Principal Investigator 1994-present
Director, LIGO Laboratory 1997-present

Caltech High Energy Physics Group
Principal Investigator 1984-96

NCR Board of Physics and Astronomy
Neutrino Facilities Assessment Committee
Chair 2002–present
Report November 2002 "Neutrinos & Beyond"

High Energy Physics Advisory Panel (HEPAP) to DoE and NSF
Co-chair of Subpanel to define a "Long Range Plan for the U.S. High Energy Physics (HEP) program" 2001-2002

IUPAP U.S. Liaison Committee
Chair 2002-present

IUPAP Panel on Nuclear, Particle and Gravitational-Wave Astrophysics (PaNAGIC)
Member 1998-present

IUPAP Commission on Particles and Fields (C-11) 1990-1999

IUPAP Commission on Cosmic Rays (C-4) Associate Member 1992-present

American Physical Society 1992-present

IceCube – NSF South Pole Neutrino Array
Oversight Committee – Chair 2001–2002

Sudbury Neutrino Observatory (SNO) Agency Review Committee 1991-2002

Biographical Information

Barry C. Barish

Barry C. Barish is the Director of the Laser Interferometer Gravitational Wave Observatory (LIGO) and a professor of high-energy physics at the California Institute of Technology, where he has taught and conducted research since 1963. In October 2002, Dr. Barish was nominated to the National Science Board, a 24-member board that helps oversee the National Science Foundation (NSF) and advises the President and the Congress on policy issues related to science, engineering, and education.

Dr. Barish earned his Bachelor of Arts in physics in 1957 and a Ph.D. in experimental high-energy physics in 1963 from the University of California, Berkeley. At Caltech, Dr. Barish helped develop a new high-energy physics program that utilized the frontier particle accelerators. Among Dr. Barish's noteworthy experiments were those at Fermilab using high-energy neutrinos to reveal the quark substructure of the nucleon. These experiments were among the first to observe the weak neutral current, a linchpin in the Electro-Weak Unification theory of Glashow, Salam, and Weinberg.

In the 1980s, Barish initiated an ambitious international effort to build a sophisticated underground detector (MACRO) to search for the magnetic monopole and solve other problems in the emerging area of particle astrophysics. The experiments conducted underground in Italy provided some of the key evidence that neutrinos have mass. Dr. Barish is presently involved in an experiment at the Soudan Underground Mine in Minnesota (MINOS) to further study neutrino properties.

Dr. Barish was named the Maxine and Ronald Linde Professor of Physics in 1991. He became the Principal Investigator of the LIGO project in 1994 and was appointed Director of the LIGO Laboratory in 1997. LIGO is an NSF-funded, joint Caltech-MIT collaboration to detect gravitational waves from distant sources such as colliding black holes. The 4-kilometer LIGO interferometers, located in rural Louisiana and Washington State, are designed to detect ripples in space-time far smaller than the size of a proton. LIGO is well into its commissioning and has taken initial data that has already produced some improved limits on gravitational waves from astrophysics sources.

Dr. Barish served as co-chair of the subpanel of the High Energy Physics Advisory Panel (HEPAP) that developed a long-range plan for U.S. high-energy physics. He has served as chair of the Commission of Particles and Fields of the International Union of Pure and Applied Physics (IUPAP) and is currently chair of the U.S. Liaison committee to IUPAP.

In 2002 he received the Klopsteg Award of the American Association of Physics Teachers and was elected to the National Academy of Sciences. Dr. Barish chaired an NRC panel, Neutrino Facilities Assessment Committee, in 2002 that produced the NAS report, “Neutrinos and Beyond.” In 2003, he is serving as a member of the special panel for NASA that is considering the future of the Hubble Space Telescope and the transition to the James Webb Space Telescope.

October 2003

Publications

(selected list from 467 publications):

1) M. Ambrosio et al. MACRO Collaboration. SEARCH FOR DIFFUSE NEUTRINO FLUX FROM ASTROPHYSICAL COURSES WITH MACRO. Astroparticle Phys. 19, 1 (2003).

2) M. Ambrosio et al. MACRO Collaboration. SEARCH FOR COSMIC RAY SOURCES USING MUONS DETECTED BY THE MACRO EXPERIMENT. Astroparticle Phys. 18, 615 (2003).

3) M. Ambrosio et al. MACRO Collaboration. SEARCH FOR THE SIDEREAL AND SOLAR DIURNAL MODULATIONS IN THE TOTAL MACRO MUON DATA SET. Phys. Rev. D67: 042002 (2003).

4) M. Ambrosio et al. MACRO Collaboration. FINAL RESULTS OF MAGNETIC MONOPOLE SEARCHES WITH THE MACRO EXPERIMENT. Eur.Phys.J.C25:511-522 (2002).

5) B. C. Barish. THE SCIENCE AND DETECTION OF GRAVITATIONAL WAVES. Braz.J.Phys.32:831-837 (2002).

6) B.C. Barish, G. Billingsley, J. Camp, W.P. Kells, G.H. Sanders, S.E. Whitcomb, L.Y. Zhang, R.Y. Zhu (Caltech, Kellogg Lab), P.Z. Deng, Jun Xu, G.Q. Zhou, Yong Zong Zhou (Shanghai, Inst. Optics, Fine Mech.). DEVELOPMENT OF LARGE SIZE SAPPHIRE CRYSTALS FOR LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY. Prepared for IEEE 2001 Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC), San Diego, California, 4-10 Nov 2001. Published in IEEE Trans.Nucl.Sci.49:1233-1237, 2002.

7) M. Ambrosia, et. al. MACRO Collaboration. NEUTRINO ASTRONOMY WITH THE MACRO DETECTOR. Astrophys. J. 546, 1038 (2001).

8) M. Ambrosio et al. MACRO Collaboration. MATTER EFFECTS IN UPWARD GOING MUONS AND STERILE NEUTRINO OSCILLATIONS. Phys.Lett.B517:59-66 (2001).

9) B. C. Barish. TAU NEUTRINO PHYSICS: AN INTRODUCTION. Prepared for 6th International Workshop on Tau Lepton Physics (TAU 00), Victoria, British Columbia, Canada, Sept. (2000). Nucl. Phys. Proc. Suppl. 98:12-25, (2001).

10) M. Ambrosio et al. MACRO Collaboration. LOW-ENERGY ATMOSPHERIC MUON NEUTRINOS IN MACRO. Phys.Lett.B478:5-13, (2000).

11) M. Ambrosio et. al. MACRO Collaboration. NUCLEARITE SEARCH WITH THE MACRO DETECTOR AT GRAN SASSO Eur. Phys. J.C 13, 453-458 (2000).

12) B. C. Barish. THE LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY LIGO Adv. Space Res. 25, 6, 1165-1169 (2000).

13) B. C. Barish. DETECTING GRAVITATIONAL WAVES. PROBING LUMINOUS AND DARK MATTER; A SYMPOSIUM IN HONOR OF ADRIAN MELISSINOS. World Sci. Publ. Co., Editors: A. Das & T. Ferbel, 18-30 (2000).

14) B. C. Barish and Rainer Weiss. LIGO AND THE DETECTION OF GRAVITATIONAL WAVES Physics Today October (1999).

15) B. C. Barish. MINOS - A STATUS REPORT. Nucl. Phys. B (Proc. Suppl.) 70 227-229 (1999).

16) M. Ambrosio et al., MEASUREMENT OF THE ATMOSPHERIC NEUTRINO INDUCED UPGOING MUON FLUX USING MACRO. Phys.Lett.B434:451-457 (1998).

17) M. Ambrosio, et. al. MACRO Collaboration. REAL TIME SUPERNOVA NEUTRINOBURST DETECTION WITH MACRO Astropart.Phys.8, 28-133 (1998).

18) J. Gronberg et al., MEASUREMENTS OF THE MESON – PHOTON TRANSITION FORM-FACTORS OF LIGHT PSEUDOSCALAR MESONS AT LARGE MOMENTUM TRANSFER. Phys.Rev.D57:33-54 (1998).

19) R. Ammar, et al. A MEASUREMENT OF THE MICHEL PARAMETERS IN LEPTONIC DECAYS OF THE TAU. PHYS. Rev. Lett. 78, 4686 (1997).

20) B. C. Barish. BEYOND THE DESERT 1997 - NON-ACCELERATOR APPROACHS. Editors H.V. Klapdoc-Kleingrothaus, 564-568 (1997).

21) M.Ambrosio et. al. MACRO Collaboration. MAGNETIC MONOPOLE SEARCH WITH THE MACRO DETECTOR AT GRAN SASSO.. Phys.Lett. B406 249-255 (1997).

22) M.Ambrosio et. al. MACRO Collaboration. SEASONAL VARIATIONS IN THE UNDERGROUND MUON INTENSITY AS SEEN BY MACRO Astropart. Phys. 7 109-124 (1997).

23) J.P. Alexander et al., FIRST MEASUREMENT OF THE B > PI LEPTON NEUTRINO AND B ---> RHO (OMEGA) LEPTON NEUTRINO BRANCHING FRACTIONS. Phys.Rev.Lett.77:5000-5004 (1996).

24) D.M. Asner et al., SEARCH FOR EXCLUSIVE CHARMLESS HADRONIC B DECAYS. Phys.Rev.D53:1039-1050 (1996).

25) B. Barish et al., MEASUREMENTS OF THE B SEMILEPTONIC BRANCHING FRACTION WITH LEPTON TAGS. Phys.Rev.Lett.76:1570-1574 (1996).

26) S. Ahlen et al., ATMOSPHERIC NEUTRINO FLUX MEASUREMENT USING UPGOING MUONS. Phys.Lett.B357:481-486 (1995).

27) M.S. Alam et al., FIRST MEASUREMENT OF THE RATE FOR THE INCLUSIVE RADIATIVE PENGUIN DECAY B ---> S GAMMA. Phys.Rev.Lett.74:2885-2889 (1995).

28) B. Barish et al., MEASUREMENT OF THE ANTI-B ---> D* LEPTON ANTI-NEUTRINO BRANCHING FRACTIONS AND |V(CB)|. Phys.Rev.D51:1014-1033 (1995).

29) M.S. Alam et al., EXCLUSIVE HADRONIC B DECAYS TO CHARM AND CHARMONIUM FINAL STATES. Phys.Rev.D50:43-68 (1994).

30) D. Acosta et al., FIRST MEASUREMENT OF GAMMA (D(S)+ ----> MU+ NEUTRINO) / GAMMA (D(S)+ ---> PHI PI+) Phys.Rev.D49:5690-5700 (1994).

31) D. Cinabro et al., OBSERVATION OF D0 ---> K+ PI-. Phys.Rev.Lett.72:1406-1410 (1994).

32) S.P. Ahlen, et al. MACRO Collaboration. SEARCH FOR SLOWLY MOVING MONOPOLES WITH THE MACRO DETECTOR.. Phys. Rev. Lett.72, 608 (1994).

33) J. Bartelt et al., MEASUREMENT OF CHARMLESS SEMILEPTONIC DECAYS OF B MESONS. Phys.Rev.Lett.71:4111-4115 (1993).

34) M. Battle et al., OBSERVATION OF B0 DECAY TO TWO CHARMLESS MESONS. Phys.Rev.Lett.71:3922-3926 (1993).

35) J. Bartelt et al., TWO MEASUREMENTS OF B0 ANTI-B0 MIXING. Phys.Rev.Lett.71:1680-1684 (1993).

36) R. Ammar et al., EVIDENCE FOR PENGUINS: FIRST OBSERVATION OF B ---> K* (892) GAMMA. Phys.Rev.Lett.71:674-678 (1993).

37) S.P. Ahlen et al., FIRST SUPERMODULE OF THE MACRO DETECTOR AT GRAN SASSO. Nucl.Instrum.Meth.A324:337-362,1993

38) D. Cinabro, et al. CLEO Collaboration. A LIMIT ON THE TAU-NEUTRINO MASS. Phys. Rev. Lett.70, 3700-3704 (1993).

39) B.C. Barish et al. TAU --> GAMMA MU : A TEST OF LEPTON NUMBER CONSERVATION. Phys. Rev. Lett.70, 138-142 (1993).

40) S.P. Ahlen, et al. MACRO Collaboration. STUDY OF THE ULTRAHIGH-ENERGY PRIMARY COSMIC RAY COMPOSITION WITH THE MACRO EXPERIMENT Phys. Rev. D46, 895-902 (1992).

41) S.P. Ahlen, et al. MACRO Collaboration. SEARCH FOR NUCLEARITES USING THE MACRO DETECTOR. Phys. Rev. Lett. 69, 1860-1863 (1992).

42) S.P. Ahlen, et al. MACRO Collaboration. SEARCH FOR NEUTRINO BURSTS FROM COLLAPSING STARS WITH THE MACRO DETECTOR.. Phys.Rev. D46,895-902(1992).

43) F. Butler et al., MEASUREMENT OF THE D* (2010) BRANCHING FRACTIONS. Phys.Rev.Lett.69:2041-2045,1992

44) Y. Kubota et al., THE CLEO-II DETECTOR. Nucl.Instrum.Meth.A320:66-113,1992

45) Sachio Komamiya et al., DETERMINATION OF ALPHA-S FROM A DIFFERENTIAL JET MULTIPLICITY DISTRIBUTION AT SLC AND PEP. Phys.Rev.Lett.64:987,1990.

46) G.S. Abrams et al., MEASUREMENTS OF Z BOSON RESONANCE PARAMETERS IN E+ E- ANNIHILATION. Phys.Rev.Lett.63:2173,1989

47) G.S. Abrams et al., INITIAL MEASUREMENTS OF Z BOSON RESONANCE PARAMETERS IN E+ E- ANNIHILATION. Phys.Rev.Lett.63:724,1989

48) G.S. Abrams et al., SEARCHES FOR NEW QUARKS AND LEPTONS PRODUCED IN Z BOSON DECAY.Phys.Rev.Lett.63:2447,1989

49) S. Bethke et al., STUDIES OF JET PRODUCTION RATES IN E+ E- ANNIHILATION AT E(CM) = 29-GEV. Z.Phys.C43:325,1989.

50) G.S. Abrams et al., THE MARK-II DETECTOR FOR THE SLC. Nucl.Instrum.Meth.A281:55,1989.

51) Petersen et al., MULTI - HADRONIC EVENTS AT E(CM) = 29-GEV AND PREDICTIONS OF QCD MODELS FROM E(CM) = 29-GEV TO E(CM) = 93-GEV. Phys.Rev.D37:1,1988

52) B.C. Barish, R. Stroynowski, THE PHYSICS OF THE TAU LEPTON. Phys.Rept.157:1,1988

53) W. Ruckstuhl et al., STUDY OF THE THREE PRONG TAU DECAYS AND DETERMINATION OF THE A1 PARAMETERS. Phys.Rev.Lett.56:2132,1986.

54) G.B. Mills et al., AN UPPER BOUND ON THE TAU-NEUTRINO MASS FROM THE PREVIOUSLY UNOBSERVED DECAY MODE TAU --->K K PI TAU-NEUTRINO. Phys.Rev.Lett.54:624,1985.

55) H. Yamamoto et al., CHARGED D* PRODUCTION IN E+ E- ANNIHILATION AT 29-GEV AND A LIMIT ON D0 - ANTI-D0 MIXING. Phys.Rev.Lett.54:522-525,1985

56) B.C. Barish et al., OBSERVATION OF TRIMUON PRODUCTION BY NEUTRINOS. Phys.Rev.Lett.38:577-580,1977

57) B.C. Barish et al., MEASUREMENTS OF MUON-NEUTRINO N AND ANTI-MUON-NEUTRINO N CHARGED CURRENT TOTAL CROSS-SECTIONS. Phys.Rev.Lett.39:1595,1977.

58) 47) B.C. Barish et al., NEUTRINO INTERACTIONS WITH TWO MUONS IN THE FINAL STATE Phys.Rev.Lett.36:939,1976.

59) B.C. Barish et al., MEASUREMENT OF NEUTRINO AND ANTI-NEUTRINO TOTAL CROSS-SECTIONS AT HIGH-ENERGY. Phys.Rev.Lett.35:1316,1975.

60) B.C. Barish et al., NEUTRAL CURRENTS IN HIGH-ENERGY NEUTRINO COLLISIONS: AN EXPERIMENTAL SEARCH. Phys.Rev.Lett.34:538,1975.

61) B.C. Barish et al., GAUGE - THEORY HEAVY MUONS: AN EXPERIMENTAL SEARCH. Phys.Rev.Lett.32:1387,1974.

62) 51) Paul N. Kirk et al., ELASTIC ELECTRON – PROTON SCATTERING AT LARGE FOUR MOMENTUM TRANSFER. Phys.Rev.D8:63-91,1973.

63) D.H. Coward et al., ELECTRON - PROTON ELASTIC SCATTERING AT HIGH MOMENTUM TRANSFERS. Phys.Rev.Lett.20:292-295,1968