KONSTANTIN GOULIANOS

Professor and Head of Laboratory of High Energy Physics
The Rockefeller University

Curriculum Vitae
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For publications, talks, students and Lab see:
http://physics.rockefeller.edu/dino/my.html

OFFICE

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EDUCATION

1958	University of Thessaloniki, Greece
1960	MA, Columbia University
1963	PhD, Columbia University

PhD Thesis: **"Experimental Proof of the Existence of Two Neutrinos"**
- cited for the 1988 Nobel prize in physics

Thesis Adviser: Melvin Schwartz

EMPLOYMENT

1959-1963	Research Assistant	Columbia University
1963-1964	Research Associate	Columbia University
1964-1967	Instructor	Princeton University
1967-1971	Assistant Professor	Princeton University
1971-1981	Associate Professor	Rockefeller University
1981	Professor	Rockefeller University

HONORS

Fulbright Scholar (1958-1959)
Fellow, American Physical Society

PATENTS

"A simple Electronic Apparatus for the Analysis of Radioactively Labeled Gel Electrophoretograms"
Analytical Biochemistry Vol 103 Iss 1, Pgs 64-69 (1980)

RESEARCH ACTIVITIES - Konstantin Goulianos

1958-64, Columbia University Participated in the "two-neutrino experiment" performed at the Brookhaven AGS accelerator. Co-discovered the muon-neutrino (Ph.D. thesis; **1988 Nobel Prize in physics** awarded to Professors Leon Lederman, Melvin Schwartz, and Jack Steinberger). Hardware: spark chamber development; construction and testing of 130 large scintillation counters used for triggering the spark chambers.

1964-71, Princeton University Performed experiments on CP violation and time reversal invariance using the Princeton-Penn 3 GeV accelerator. Measured the $K_2^0 \to 2\pi^0$ decay rate, reciprocity in $np \to d\gamma$, and $K\mu 3$ transverse polarization. Worked on ardware: development of wire chambers with magnetostrictive readout.

1971-present, The Rockefeller University Worked at Brookhaven National Laboratory (BNL), Fermilab, and the Large Hadron Collider (LHC) at CERN.

BNL:

Neutrino-proton elastic scattering. High voltage spark chamber electronics.

Fermilab:

Internal target experiments, E-36 and follow-ups including the use of a hydrogen/deuterium gas-jet target (Soviet-American Collaboration). Measured the ρ-value of pp elastic scattering, indirectly confirming the rise of the pp total cross section with energy. Measured pp and pd diffraction dissociation and established the $\sim 1/M^2$ law and factorization. Worked on total absorption and position sensitive silicon detectors.

E-396 (spokesperson). Measured diffraction dissociation of $p^{\pm}$, $\pi^{\pm}$ and $K^{\pm}$ on protons. Established Regge factorization (diffractive cross sections are proportional to the corresponding total inelastic cross sections), and universality between diffractive and non-diffractive charged multiplicity distributions. Developed low mass drift chambers using He as a drift gas.

E-612 (spokesperson). Measured diffractive photon dissociation: established $1/M^2$ behavior and factorization. Developed a 15 atm hydrogen gas time projection chamber (TPC), which acted both as a target for a high energy tagged photon beam and as a detector for the recoil protons. Requiring high purity hydrogen, a 150 KV electric field over a drift distance of 75 cm, and a "barrel" of plastic scintillator counters inside the high pressure vessel for measuring the energy of the recoil proton, the TPC was a challenging engineering and detector development project.

CDF Collaboration (Rockefeller group leader since 1985). *Physics*: Elastic, diffractive, and total cross sections, prompt photon cross sections, top quark discovery and mass measurement, inclusive jet differential cross section, x_T-scaling, measurement of "running" of α_s, discovery of Λ_b, soft/hard diffraction studies. *Hardware*: Drift chambers for the total cross section measurement, design of beryllium beam pipe, MicroPlug calorimeters for diffraction studies in Run I, shower-maximum detector and fiber-splicing machines for the plug calorimeter upgrade, beam-loss/shower counters, MiniPlug calorimeters, scintillator-tile preshower detector.

CERN:

***Spp*S, UA6 Collaboration**. Precise comparison of $\bar{p}p$ and pp elastic scattering at $\sqrt{s}$ =24.3 GeV, using silicon detectors to observe protons recoiling from a a hydrogen cluster-jet target intercepting the stored proton beams,
http://www.sciencedirect.com/science/article/pii/0370269389911507

LHC, CMS experiment, http://physics.rockefeller.edu/. Higgs-boson discovery, diffraction sissociation measurements and phenomenology.

SELECTED PUBLICATIONS - Konstantin Goulianos

1. Discovery of the muon-type neutrino

   - *Observation of High-Energy Neutrino Reactions and the Existence of Two Kinds of Neutrinos*
     G. Danby, J.-M. Gaillard, K. Goulianos, L.M. Lederman*, N. Mistry, M. Schwartz* and J. Steinberger*, Phys. Rev. Lett **9**, 36-44 (1962).
     *** 1988 Nobel Prize in Physics** for the ν_μ discovery.
   - *Experimental Proof of the Existence of Two Neutrinos*
     Konstantin Goulianos, **Ph. D. Thesis**, Columbia University, June 1963.

2. *Experimental Test of Time-Reversal Invariance in the Decay* $K_L^0 \to \pi^- \mu^+ \nu$
   D. Bartlett, C.E. Friedberg, K. Goulianos and D. Hutchinson,
   Phys. Rev. Lett **16**, 282-285 (1966).

3. *Observation of the Reaction* $\nu_\mu + p \to \nu_\mu + p$
   W. Lee *et al.*, Phys. Rev. Lett. 37 (1976) 186.

4. *Diffractive Interactions of Hadrons at High Energies*
   K. Goulianos, Phys. Repots. 1 (1983) 169-219.

5. *Diffraction Dissociation of Photons on Hydrogen*
   T. Chapin *et al.*, Phys. Rev. D **31**, 17-30 (1985).

6. *Diffractive dijet production in* $\bar{p}p$ *collisions at* $\sqrt{s}$ *=1.96 TeV*
   A. Aaltonen *et al.*, Phys. Rev. D **86**, 03209 (2012).

7. Discovery of the Top Quark

   - A. Abe *et al.*,*Observation of Top Quark Production in* $\bar{p}p$ *Collisions with the Collider Detector at Fermilab*, Phys. Rev. Lett. **74**, 2626 (2012).

8. Discovery of the Higgs Boson

   - S. S. Chatrchyan *et al.*,*Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC*, Phys. Lett. B 716 (2012) 30.

9. *Measurement of diffraction dissociation cross sections in pp collisions at* $\sqrt{s} = 7$ *TeV*, V. Khachatryan *et al.*(CMS Collaboration) Phys. Rev. **D**92 (2015) 1, 012003.

10. Reference review of *Diffractive results from CDF*,
    K. Goulianos, Int. J. Mod. Phys. **A30** (2015) 08, 1542003.