• A: Nobel Prize 1990 - Friedman, Kendall, Taylor for their pioneering investigations concerning deep inelastic scattering of electrons on protons and bound neutrons, which have been of essential importance for the development of the quark model in particle physics."



"Ex Graduate Students" Riordan and Bodek at the 1990 Nobel Ceremony

A few words by Arie Bodek - University of Rochester

(1) What did we learn as MIT graduate students from Jerry Friedman?

(2) What Jerry Friedman neglected to tell us?

What did we learn as MIT graduate students from Jerry Friedman?

(1) The need to Understand both Experiment and Theory.

- (2) The need to Understand all Sources of Systematic Errors.
- (3) To continuously work towards higher precision and maintain high standards.

- 1970-74 Neutron/Proton ratio Partons are quarks (Bodek PhD. MIT 1972)
 - A. Bodek et al., COMPARISONS OF DEEP INELASTIC ep AND en CROSS-SECTIONS. Phys.Rev.Lett.30:1087,1973. (SLAC Exp. E49)
 - A. Bodek et al., THE RATIO OF DEEP INELASTIC en TO ep CROSS-SECTIONS IN THE THRESHOLD REGION Phys.Lett.B51:417,1974 & (SLAC E87) Rejected by Phys. Rev Letters.
 - A. Bodek, COMMENT ON THE EXTRACTION OF NUCLEON CROSS SECTIONS FROM DEUTERIUM DATA, Phys. Rev. D8, 2331 (1973).



(2) What Jerry Friedman neglected to tell us that many physicists are not as talented and kind as him

PHYSICAL REVIEW LETTERS

(PUBLISHED FOR THE AMERICAN PHYSICAL SOCIETY)

BROOKHAVEN NATIONAL LABORATORY, UPTON, LONG ISLAND, NEW YORK 11973 Telephone (516) 924-6262, Ext. 2296

3 June 1974

Dear Dr. Coward,

The following manuscript has been reviewed by one of our referees: "Ratio of Deep-Inelastic e-n to e-p Cross Sections in the..." by A. Bodek, et al.

On the basis of his comments, our judgement is that while a report of this work may deserve publication, it is not of such novel and stimulating character as to warrant publication as a Letter. In addition, the report as submitted appears too abbreviated to be satisfactory as an Article.

C.L. SNEAD J Assistant Editors D. NORDSTR(G. DREISS G. WELLS Assistants to the P. IRVING S. McVOY M. DE LORIA Physical Review Le

Editors S.A. GOUDS/ GEORGE L. 1 Assistant Editor R.H. TUCKER Publication Mar M.J. FLEMIN(

What did the referee say

For experts in the field, one recognizes the fact that more detailed measurements have been made since the original article of Bodek, et. al. {Physical Review Letters, 30, 1086 (1973)}. My major concern remains in that this paper offers no substantially new information or conclusion to the general readership of Physical Review Letters.

I regard this as an excellent piece of work to follow up the earlier experiment. However, it does not warrant a speedy publication in <u>Physical Review Letters</u> in view of the fact that dramatically new and potentially much more exciting results are forthcoming in data from NAL at high q² as well as from the e⁺e⁻ storage rings.



Jerry and the MIT-SLAC group got the credit for the discovery of the Quark.

They did not, but should have, also got the credit for the discovery of the GLUON.

Integral of F2(x) did not add up to 1.0. Missing momentum attributed to "gluons".

Like Pauli's missing energy in beta decay attributed to neutrinos *Gluons were "Discovered" in 1970, way before PETRA.

Scatter shows F2(x, Q2) as expected from bremstrahlung of gluons by struck quarks in initial of final states.

Scaling violations from "gluon" emission discovered in 1973, way before PETRA

First observation of Scaling Violations - Higher Twist or QCD ? **

E. M. Riordan, A. Bodek et al., TESTS OF SCALING OF THE PROTON **ELECTROMAGNETIC STRUCTURE FUNCTIONS Phys.Lett.B52:249,1974.**



Also Rejected by Phys. Rev. Letters

D <u>Quark Distributions in Nuclei</u>

- A. Bodek, EMPTY TARGET SUBTRACTIONS AND RADIATIVE CORRECTIONS IN ELECTRON SCATTERING EXPERIMENTS, Nucl. Inst. Meth. 109 (1973). - factor of 6 increase in rate of empty target data by making empty target same radiation length as H2 and D2 targets; - used in SLAC E87 - more payoff later
- A. Bodek, J.L. Ritchie, FERMI MOTION EFFECTS IN DEEP INELASTIC LEPTON SCATTERING FROM NUCLEAR TARGETS, Phys.Rev.D23:1070,1981; Phys.Rev.D24:1400,1981.
- A. Bodek et al., ELECTRON SCATTERING FROM NUCLEAR TARGETS AND QUARK DISTRIBUTIONS IN NUCLEI. Phys.Rev.Lett.50:1431,1983.. - Use Empty Target Data from SLAC E87 (1972) - Rejected by Phys. Rev. Letters at first.
- A. Bodek et al., A COMPARISON OF THE DEEP INELASTIC STRUCTURE FUNCTIONS OF DEUTERIUM AND ALUMINUM NUCLEI. Phys.Rev.Lett.51:534,1983. Use empty target data from SLAC E49B (1970) Also Rejected by Phys. Rev. Letters at first.

 Quark Distributions in Nuclei A. Bodek et al Phys.Rev.Lett.51:534, 1983 (SLAC Expt. E49, E87 empty tgt data 1970,1972)

