SLAC-R-697
UC-414

Measurement of the Spin Structure Function of the Neutron G1(N) from Deep Inelastic Scattering of Polarized Electrons from Polarized Neutrons in He-3*

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SLAC-Report-697
1995

Prepared for the Department of Energy
under contract number DE-AC03-76SF00515

* Ph.D. thesis, American University, Washington DC, 20016

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FROM DEEP INELASTIC SCATTERING OF POLARIZED ELECTRONS FROM

POLARIZED NEUTRONS IN ^3He

by

James A. Dunne

submitted to the Faculty of the College of Arts and Sciences

of the American University

in Partial Fulfillment of

the Requirements for the Degree

of

Doctor of Philosophy

in

Physics

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1995
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7755

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ABSTRACT

Polarized electrons of energies 19.42, 22.67, and 25.5 GeV were scattered off a polarized ^{3}He target at SLAC's End Station A to measure the spin asymmetry of the neutron. From this asymmetry, the spin dependent structure function $g_1^n(x)$ was determined over a range in x from 0.03 to 0.6 with an average Q^2 of 2 (GeV/C)^2. The value of the integral of g_1^n over x is $\int_0^1 g_1^n(x)dx = -0.036 \pm 0.009$. The results were interpreted in the frame work of the Quark Parton Model (QPM) and used to test the Ellis-Jaffe and Bjorken sum rules. The value of the integral is 2.6 standard deviations from the Ellis-Jaffe prediction while the Bjorken sum rule was found to be in agreement with this data and proton data from SMC and E-143.

ACKNOWLEDGMENTS

I would like to thank all the members of the E-142 collaboration and the SLAC technicians for making this experiment possible. They are a talented group of people. I would especially like to thank Zein-Eddine Meziani, Charlie Young, Jim Johnson, Henry Band, and Emlyn Hughes for taking the time to answer questions, give guidance, and for just being there to talk. It was also a pleasure working with my fellow graduate students, Michael Spengos, David Kawall, Yves Roblin, James Xu, and Hunter Middleton.

A great deal of credit is due to my advisors, Ray Arnold, Peter Bosted, Steve Rock, and Zen Szalata from the American University. I learned a tremendous amount from each of them. They answered all of my many questions during my tenure at SLAC. I truly benefitted from the collaborative analysis meetings we had. They hold a seemingly limitless knowledge of physics and computers. I believe I now possess a sound background in physics and that is attributed primarily to them.

I would like to extend my thanks to the professors at the American University for teaching me the fundamentals of physics and math. I genuinely enjoyed my time back at AU. Special thanks is owed to Dr. Segnan, Dr. Reiss, Dr. Kay, Dr. Schot, Dr. Casey, and Dr. Bruce Flanders. Looking back on my first year, I guess I have come a long way since my first exam in Intro to Quantum.

I have made a lot of lasting friendships during the last few years. My social sanity is

due to people like Jim Talamonti, Mervyn Naidoo, Jeff Fellbaum, Thia Keppel, Barry Hellman, Rolf Ent, Rad Antonov, Dave Reyna, and Robin Erbacher. But most of all to Michael and Effie Spengos. They are great people and great neighbors. I am indebted for life to Effie and her cooking (especially her fish). They made life in California truly enjoyable. I worked very closely with Michael and I have tremendous respect for him, his family and his physics. Thanks for everything.

A huge amount of thanks is due to my family for the support given during my many years as a student. But the most gratitude is due to my wife who had to put up with me during the writing of this document. She has helped me in countless ways and probably now knows (against her will) more about spin physics than most. We have spent some very long days and nights trying to produce this final document and that alone deems her worthy of all my gratitude. But it goes beyond that; she is my best friend, she is my life. And for those reasons, I dedicate this thesis to her, Demi.

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