

CURRICULUM VITAE

Pekka K. Sinervo

A. Biographical Information

1. Personal

Personal Data:

Pekka K. Sinervo
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2. Degrees

Degree	:	Ph.D. Elementary Particle Physics
Thesis	:	Study of Strange Meson Spectrum as Observed in the Reaction $K^-p \rightarrow K^0\pi^+\pi^-n$ at 11 GeV/c
Advisor	:	D. W. G. S. Leith
Institution	:	Stanford University
Date	:	May 1986
Degree	:	B.Sc. (4 year) Mathematics and Physics
Institution	:	University of Toronto
Date	:	May 1980

3. Employment

- Senior Vice-President, Research, Canadian Institute for Advanced Research (May 2009 - present)
- Rosi and Max Varon Visiting Professor, Weizmann Institute of Science, Rehovot, Israel (Sep 2008 - Apr 2009)
- Vice-Provost, First-Entry Programs, University of Toronto (Nov 2006 - Feb 2008)
- Dean, Faculty of Arts and Science, University of Toronto (Jan 2004 - Feb 2008)

- Interim Dean, Faculty of Arts and Science, University of Toronto (May 2003 - Dec 2003)
- Vice-Dean, Academic, Faculty of Arts and Science, University of Toronto (Jan 2003 - Apr 2003)
- Vice-Dean, Graduate Education and Research, Faculty of Arts and Science, University of Toronto (Sep 2000 - Dec 2002)
- Chair, Department of Physics, University of Toronto (Jul 1997 - Aug 2000)
- Visiting Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA (Jan 1997 - Jun 1997)
- Professor, Department of Physics, University of Toronto (Jul 1995 - present)
- Associate Professor of Physics, Department of Physics, University of Toronto (Jul 1990 - Jun 1995) (tenure awarded in May 1993)
- Visiting Scientist, Fermi National Accelerator Laboratory, Batavia, IL, Feb 1994 - Jul 1994)
- Assistant Professor, Department of Physics, University of Pennsylvania (Jul 1988 - Jun 1990)
- Postdoctoral Researcher, Department of Physics, University of Pennsylvania (Jun 1986 - Jun 1988)

4. Honours

Feb 2012	Fellow, American Association for the Advancement of Science
Jan 2008	Acenberg Award, Rotman Research Institute
Jun 2007	Patron of the Society, Canadian Astronomical Society
Jul 2004	Senior Fellow, Massey College, University of Toronto
May 2004	Fellow, American Physical Society
Nov 1999	Fellow, Royal Society of Canada
Nov 1995	Rutherford Memorial Medal in Physics, Royal Society of Canada
Feb 1995	Outstanding Teaching Award, Faculty of Arts and Science, University of Toronto
Jun 1980	Reuben Wells Leonard Scholarship for the Physical Sciences University College, University of Toronto
Mar 1980	NSERC Postgraduate Scholarship (renewed 1982) Natural Sciences and Engineering Research Council
Mar 1980	NSERC 1967 Science Scholarship (declined) Natural Sciences and Engineering Research Council
Mar 1979	Harry M. Boxen Memorial Scholarship University College, University of Toronto
Apr 1976	C.L. Burton Scholarship

5. Professional Affiliations

- Member, Canadian Association of Physicists
- Member, Institute of Particle Physics
- Member and Fellow, American Association for the Advancement of Science
- Member and Fellow, American Physical Society
- Fellow, Royal Society of Canada

B. Academic History

6. a. Research Activities

My primary interests are the study of high-energy hadron collisions produced at the very highest energies possible. My research focuses on the ATLAS experiment at the CERN Large Hadron Collider (LHC) in Geneva, Switzerland, where we are studying 7 and 8 TeV proton-proton collisions. I am also completing studies of 2 TeV proton-antiproton collisions at the Collider Detector at Fermilab (CDF), a facility designed, constructed and operated by a collaboration of physicists from 40 institutions. I am particularly interested in studies of the top quark, the last of the expected fundamental building blocks predicted by the current “Standard Model” of high energy physics to be discovered. Having published conclusive evidence of its existence in 1995, I am still involved in top quark studies using data collected by the ATLAS experiment. My students and I have specialized in developing techniques for making innovative measurements of top quark properties. I am also involved in the development of advanced statistical techniques applied to the analysis of particle physics data.

I have held various leadership and management roles. I was head of the Canadian CDF group from its inception in 1990 to 1999 and was one of the two coordinators of the CDF Heavy Flavour group for over two years between 1990 and 1992. This internal group was the focus of all of the collaborations research in heavy quark physics (top quark searches and bottom quark studies). I also was the head of the CDF Offline Group from 1993 to 1995. During that time, I was responsible for all software development, data processing and central computing facilities within the collaboration. I have served as member or chair of approximately 35 internal review committees in CDF over the last 25 years.

My secondary research activity is the development of advanced detectors and computational systems for the CDF and ATLAS experiments. My group designed parts of the data collection systems for the SDC detector, a device that was intended to search for the Higgs boson at the Superconducting Super Collider (SSC). I am now collaborating on the development of a Grid

computing model for the ATLAS experiment that is proposed to perform a similar search at the Large Hadron Collider (LHC). My group designed a system of electronics that would allow the CDF detector to detect and measure charged particles in the Level 1 trigger system.

My research interests prior to 1986 focused on the study of strange mesons, which formed the topic of my Ph.D. dissertation. I studied the orbitally and radially excited states of the K^* meson, as this system provided us with the cleanest experimental view of the spectroscopy of a light quark-antiquark state.

During the period 1978 through 1980, I participated in the first measurements of the lifetimes of charmed hadrons as a member of a University of Toronto research group.

C. Scholarly and Professional Work

7. Refereed Publications (total of 1031)

The following publications are my most relevant publications, following the guidelines developed by the Commission of Particles and Fields (C11) of the International Union of Pure and Applied Physics, September 2008. I have either been a primary author of the publication, or made significant specific contributions to the work therein, either as one of the working co-authors or through specific intellectual contributions to the study.

1. T. A. Aaltonen *et al.* [CDF Collaboration] (primary author), “*Studies of high-transverse momentum jet substructure and top quarks produced in 1.96 TeV proton-antiproton collisions*” arXiv:1407.3484 [hep-ex], 10.1103/PhysRevD.91.032006
Phys. Rev. D **91**, no. 3, 032006 (2015)
2. G. Aad *et al.* [ATLAS Collaboration] (secondary author), “*Performance of jet substructure techniques for large- R jets in proton-proton collisions at $\sqrt{s} = 7$ TeV using the ATLAS detector*” arXiv:1306.4945 [hep-ex], 10.1007/JHEP09(2013)076
JHEP **1309**, 076 (2013).
3. G. Aad *et al.* [ATLAS Collaboration] (primary author), “*Search for resonances decaying into top-quark pairs using fully hadronic decays in pp collisions with ATLAS at $\sqrt{s} = 7$ TeV*” arXiv:1211.2202 [hep-ex], 10.1007/JHEP01(2013)116,
JHEP **1301**, 116 (2013).
4. G. Aad *et al.* [ATLAS Collaboration] (primary author), “*ATLAS measurements of the properties of jets for boosted particle searches*” arXiv:1206.5369 [hep-ex], 10.1103/PhysRevD.86.072006,
Phys. Rev. D **86**, 072006 (2012).

5. G. Aad *et al.* [ATLAS Collaboration] (secondary author), “*Jet mass and substructure of inclusive jets in $\sqrt{s} = 7$ TeV pp collisions with the ATLAS experiment*”
arXiv:1203.4606 [hep-ex], 10.1007/JHEP05(2012)128,
JHEP **1205**, 128 (2012).
6. A. Altheimer, S. Arora, L. Asquith, G. Brooijmans, J. Butterworth, M. Campanelli, B. Chapeau and A. E. Cholakian *et al.* (secondary author), “*Jet Substructure at the Tevatron and LHC: New results, new tools, new benchmarks*”
arXiv:1201.0008 [hep-ph], 10.1088/0954-3899/39/6/063001,
J. Phys. G **39**, 063001 (2012).
7. T. Aaltonen *et al.* [CDF Collaboration] (primary author), “*Study of Substructure of High Transverse Momentum Jets Produced in Proton-Antiproton Collisions at $\sqrt{s} = 1.96$ TeV*”,
arXiv:1106.5952 [hep-ex], 10.1103/PhysRevD.85.091101,
Phys. Rev. D **85**, 091101 (2012)
8. G. Aad *et al.* [ATLAS Collaboration] (primary author), “*Measurement of the top quark pair production cross section in pp collisions at $\sqrt{s} = 7$ TeV in dilepton final states with ATLAS*”
Phys. Lett. B **707**, 459 (2012) arXiv:1108.3699 [hep-ex]
9. G. Aad *et al.* [ATLAS Collaboration] (primary author), “*Search for New Physics in Dijet Mass and Angular Distributions in pp Collisions at $\sqrt{s} = 7$ TeV Measured with the ATLAS Detector,*”
New J. Phys. **13**, 053044 (2011) [arXiv:1008.2461 [hep-ex]].
10. R. Alon, E. Duchovni, G. Perez, A. P. Pranko, P. K. Sinervo (primary author), “*A Data-Driven Method of Pile-Up Correction for the Substructure of Massive Jets,*”
Phys. Rev. D **84**, 114025 (2011) [arXiv:1101.3002 [hep-ph]].
11. A. Abdesselam, E. B. Kuutmann, U. Bitenc, G. Brooijmans, J. Butterworth, P. Bruckman de Renstrom, D. Buarque Franzosi, R. Buckingham *et al.* (secondary author), “*Boosted Objects: A Probe of Beyond the Standard Model Physics,*”
Eur. Phys. J. C **71**, 1661 (2011) [arXiv:1012.5412 [hep-ph]].
12. T. Aaltonen *et al.* [CDF Collaboration] (secondary author), “*Measurement of $t\bar{t}$ Spin Correlation in $p\bar{p}$ Collisions Using the CDF II Detector at the Tevatron,*”
Phys. Rev. **D83**, 031104 (2011). [arXiv:1012.3093 [hep-ex]].
13. G. Aad *et al.* [ATLAS Collaboration] (primary author), “*Search for New Particles in Two-Jet Final States in 7 TeV Proton-Proton Collisions with the ATLAS Detector at the LHC,*”
Phys. Rev. Lett. **105**, 161801 (2010). [arXiv:1008.2461 [hep-ex]].
14. T. Aaltonen *et al.* (secondary author), “*Measurement of the Fraction of $t\bar{t}$ Production via Gluon-Gluon Fusion in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV,*”
Phys. Rev. D **79**, 031101 (2009) [arXiv:0807.4262 [hep-ex]].

15. T. Aaltonen *et al.* (primary author), “*First Measurement of the Fraction of Top Quark Pair Production Through Gluon-Gluon Fusion,*” Phys. Rev. D **78**, 111101 (2008). [arXiv:0712.3273 [hep-ex]].
16. A. Abulencia *et al.* (primary author), “*Precise Measurement of the Top Quark Mass in the Lepton + Jets Topology at CDF II,*” Phys. Rev. Lett. **99**, 182002 (2007).
17. A. Abulencia *et al.* (primary author), “*Top Quark Mass Measurement Using the Template Method in the Lepton + Jets Channel at CDF II,*” Phys. Rev. D **73**, 032003 (2006).
18. A. Abulencia *et al.* (primary author), “*Precision Top Quark Mass Measurement in the Lepton + Jets Topology in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV,*” Phys. Rev. Lett. **96**, 022004 (2006).
19. *Search for a W' Boson Decaying to a Top and Bottom Quark Pair in 1.8 TeV $p\bar{p}$ Collisions,* D. Acosta *et al.* (primary author), Phys. Rev. Lett. **90**, 081802 (2003).
20. *Signal Significance in Particle Physics,* P. K. Sinervo, hep-ex/0208005 (August 2002). Published in the Proceedings of the Conference on Advanced Statistical Techniques in Particle Physics, Durham England, Mar 16-22 (2002).
21. *Search for Single Top Quark Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV,* D. Acosta *et al.* (secondary author), Phys. Rev. D **65**, 091102 (2002).
22. *Measurement of the Top Quark P_T Distribution in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV,* T. Affolder *et al.* (primary author), Phys. Rev. Lett. **87**, 102001 (2001).
23. *Search for a W' Boson via the Decay Mode $W' \rightarrow \mu\nu_\mu$ in 1.8-TeV $p\bar{p}$ Collisions,* F. Abe *et al.* (primary author), Phys. Rev. Lett. **84**, 5716-5721 (2000).
24. *Measurement of b Quark Fragmentation Fractions in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV,* T. Affolder *et al.* (primary author), Phys. Rev. Lett. **84**, 1663-1668 (2000).
25. *Measurement of b Quark Fragmentation Fractions in the Production of Strange and Light B Mesons in Proton Anti-Proton Collisions at $\sqrt{s} = 1.8$ TeV,* F. Abe *et al.* (primary author), Phys. Rev. D. **60**, 092005 (1999).
26. *CVD Diamond Pixel Detectors for LHC Experiments,* R. Wedenig *et al.* (secondary author), Nucl. Phys. Proc. Suppl. **78**, 497-504 (1999).
27. *The First Bump Bonded Pixel Detectors on CVD Diamond,* W. Adam *et al.* (secondary author), Nucl. Instrum. Methods **A43**, 326-335 (1999).
28. *Observation of $B^+ \rightarrow \psi(2S)K^+$ and $B^0 \rightarrow \psi(2S)K^{*0}(892)$ Decays and Measurements of B Meson Branching Fractions into J/ψ and $\psi(2S)$ Final States,* F. Abe *et al.* (primary author), Phys. Rev. D **58**, 072001 (1998).

29. *Ratios of Bottom Meson Branching Fractions Involving J/ψ Mesons and Determination of b Quark Fragmentation Fractions*, F. Abe *et al.* (primary author), Phys. Rev. D **54**, 6596-6609 (1996).
30. *Observation of Top Quark Production in $p\bar{p}$ Collisions with the Collider Detector at Fermilab*, F. Abe *et al.* (primary author), Phys. Rev. Lett. **74**, 2626-2631 (1995).
31. *Evidence for top quark production in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV*, F. Abe *et al.* (primary author), Phys. Rev. **D50**, 2966-3026 (1994).
32. *Evidence for Top Quark Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV*, F. Abe *et al.* (primary author), Phys. Rev. Lett. **73**, 225-231 (1994).
33. *Limit on the Top Quark Mass from $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV*, F. Abe *et al.* (primary author), Phys. Rev. **D45**, 3921-3948 (1992).
34. *Performance and System Flexibility of the CDF Hardware Event Builder*, T. M. Shaw, K. Schurecht and P. K. Sinervo, FERMILAB-CONF-91-314 (Nov 1991). To be published in the proceedings of the IEEE Nuclear Science Symposium, Sante Fe, NM (Nov 1991).
35. *Top Quark Search in the Electron + Jets Channel in Proton-Antiproton Collisions at $\sqrt{s} = 1.8$ TeV*, F. Abe *et al.* (primary author), Phys. Rev. **D43**, 664-686 (1991).
36. *A Search for the Top Quark in the Reaction $\bar{p}p \rightarrow$ Electron + Jets at $\sqrt{s} = 1.8$ TeV*, F. Abe *et al.* (primary author), Phys. Rev. Lett. **64**, 192-196 (1990).
37. *Fast Data Acquisition with the CDF Event Builder*, P. K. Sinervo *et al.* (primary author), IEEE Trans. Nucl. Sci. **36**, 440-445 (1989).
38. *Evidence for a $J^{PC} = 4^{++}$ State at ~ 2.2 GeV c^2 From K^-p Interactions at 11 GeV c* , D. Aston *et al.* (joint author), Phys. Lett. **215B**, 199-204 (1988).
39. *The CDF Event Builder*, A.W.Booth *et al.* (primary author), IEEE Trans. Nucl. Sci. **NS-34**, 790-795 (1987).
40. *The Organization and Maintenance of the CDF Offline Code on IBM VM and DEC VAX/VMS Operating Systems*, K. Chadwick, R. Hollebeek and P.K. Sinervo (primary author), Comput. Phys. Commun. **45**, 409-415 (1987).
41. *The Strange Meson Resonances Observed in the Reaction $K^-p \rightarrow \bar{K}^0\pi + \pi^-n$ at 11 GeV c* , D. Aston *et al.* (primary author), Nucl. Phys. **B292**, 693-713 (1987).
42. *Observation of the Leading K^* L-Excitation Series from $J^P = 1^-$ Through 5^- in the Reaction $K^-p \rightarrow K^-\pi pn$ at 11 GeV c* , D. Aston *et al.* (joint author), Phys. Lett. **180B**, 308-312 (1986).

43. *A Study of the Strange Meson Spectrum as Observed in the Reaction $K^-p \rightarrow \bar{K}^0\pi + \pi^-n$ at 11 GeV c*, P.K. Sinervo, SLAC report 299, 1-233 (May 1986). Ph.D. Thesis.
44. *The SLAC Three-Body Partial Wave Analysis System*,
D. Aston, T. Lasinski and P.K. Sinervo (primary author), SLAC report 222, 1-66 (Oct 1985).
45. *The 3081/E Emulator: A Processor for use in On-line and Off-line Arrays*,
P.M. Ferran *et al.* (secondary author), SLAC preprint 3753, contributed to Conf. on Computing in High Energy Physics, Amsterdam, Netherlands, Jun 25-28, 1985.
46. *Partial Wave Analysis of the $\bar{K}^0\pi + \pi^-$ System Produced in K^-p Interactions at 11 GeV c*,
D. Aston *et al.* (primary author), Nucl. Phys. **B247**, 261-292 (1984).
47. *Observation of Two Non-leading Strangeness-one Vector Mesons*,
D. Aston *et al.* (primary author), Phys. Lett. **149B**, 258-262 (1984).
48. *Measurement of the D^+ , F^+ and Λ_c^+ Charmed Particle Lifetimes*,
N. Ushida *et al.* (joint author), Phys. Rev. Lett. **45**, 1053-1056 (1980).
49. *Measurement of the D^0 Lifetime*,
N. Ushida *et al.* (joint author), Phys. Rev. Lett. **45**, 1049-1052 (1980).

N.B. A complete list of refereed publications is available upon request.