Curriculum Vitae: Gerard Jungman

Los Alamos National Laboratory
T-8 MS B285
Los Alamos, NM 87545 USA
jungman@lanl.gov
http://t8web.lanl.gov/people/jungman
(505) 667-0369

Positions

1997-present:	Staff Member, LANL
1996-1997:	Member, Institute for Advanced Study
1993-1996:	Postdoctoral Associate, Syracuse University

Education

1993:	Ph.D., Physics, University of Chicago
1990:	M.S., Physics, University of Chicago
1987:	B.S. (Honors), Physics/Mathematics, Caltech

Honors and Awards

1987:	Carnation Fellow, Caltech
1984-1987:	ARCS Scholar, Caltech

Personal Information

Born:	1965 (Chicago, IL)
Citizenship:	US

General Skills

- Applied/Pure Mathematics
- Computational Physics
- Software Engineering

Recent Interests

- Calculation of Microwave Background Anisotropy; Radiative Transfer in Cosmological Backgrounds
- Software Framework for Calculations in Dark Matter Models
- Nonequilibrium Processes; Defect Formation and Dynamics; Dynamics of Phase Transitions
- Turbulence and Turbulent Combustion

Previous Research Areas

- Neutrino Physics
- Nonperturbative Aspects of Gauge Theories
- Formal Aspects of the Quantum Hall Effect

Professional Affiliations

- Member, American Mathematical Society

Other Activities

- ASCI Trilab Support Team Member, Stanford Turbulent Combustion Project
- Co-organizer, Santa Fe 1999 Summer Cosmology Workshop

Publications

1. *Cosmological-Parameter Determination with Microwave Background Maps* (with M. Kamionkowski, A. Kosowsky, and D. Spergel) Phys. Rev. D **54**, 1332 (1996), astro-ph/9512139.

2. *Low-energy Supersymmetry Breaking and Fermion Mass Hierarchies* (with T. Gherghetta and E. Poppitz) , hep-ph/9511317.

3. *Weighing the Universe with the Cosmic Microwave Background* (with M. Kamionkowski, A. Kosowsky, and D. Spergel) Phys. Rev. Lett. **76**, 1007 (1996), astro-ph/9507080.

4. *The Renormalization Group and Quantum Edge States* (with V. John and S. Vaidya) Nucl. Phys. **B455 [FS]**, 505 (1995), hep-th/9505024.

5. *Supersymmetric Dark Matter* (with M. Kamionkowski and K. Griest) Phys. Rep. **267**, 195 (1996).

6. *Comment on Dynamics of Weak First-Order Phase Transitions* (with G. Harris) Phys. Rev. Lett. **75**, 588 (1995), hep-th/9511057.

7. *Model Independent Comparison of Direct vs. Indirect Detection of Supersymmetric Dark Matter* (with K. Griest, M. Kamionkowski, and B. Sadoulet) Phys. Rev. Lett. **74**, 5174 (1995), hep-ph/9412213.

8. *Gamma Rays From Neutralino Annihilation* (with M. Kamionkowski) Phys. Rev. D **51**, 3121 (1995), hep-ph/9501365.

9. *Neutrinos from Particle Decay in the Sun and Earth* (with M. Kamionkowski) Phys. Rev. D **51**, 328 (1995), hep-ph/9407351.

10. *Cosmic-Ray Antiprotons from Neutralino Annihilation into Gluons* (with M. Kamionkowski) Phys. Rev. D **49**, 2316 (1995), astro-ph/9310032.

11. *Neutralino Annihilation to Gluons* (with M. Drees, M. Kamionkowski, and M. Nojiri) Phys. Rev. D **49**, 636 (1994), hep-ph/9306325.

12. *Cosmological Consequences of Spontaneous Lepton Number Violation in $SO(10)$ Grand Unification* (with T. Gherghetta) Phys. Rev. D **48**, 1546 (1993), hep-ph/9302212.

13. *P and T Violation from Certain Dimension Eight Weinberg Operators* (with M. Booth) Phys. Rev. D **47**, R4828 (1993), hep-ph/9212234.

14. *Fermion Masses in $SO(10)$: The Case of the Tree Level Relation $m_b \neq m_\tau$*, Phys. Rev. D **47**, 346 (1993).

15. *Fermion Masses in $SO(10)$*, Phys. Rev. D **46**, 4004 (1992).

16. *New Vector-Like Interactions: Constraints from Kaon Physics and from $\mu \to e\gamma$* (with J. Rosner) Phys. Lett. B **277**, 177 (1992).

17. *Further Topological Proofs of Gribov Ambiguities*, Mod. Phys. Lett. **A7**, 849 (1992).

18. *Massive Neutrinos and the Weak Scale Singlet Majoron* (with M. Luty) Nucl. Phys. **B361**, 24 (1991).

19. *Nonexistence Theorems for Asymptotically Euclidean Einstein-Matter Solutions* (with R. Wald) Phys. Rev. D **40**, 2615 (1989).

20. *The Interplanetary Magnetic Field During Solar Cycle 21: ISEE-3/ICE Observations* (with J. Slavin and E. Smith) Geophys. Res. Lett. **13**, 513 (1986).

Conference Proceedings

1. *Determining Cosmological Parameters from the Microwave Background* in *Dark Matter in the Universe Nucl. Phys. (Proc. Suppl.) 51B*, (with M. Kamionkowski, A. Kosowsky, and D. Spergel) edited by D. Cline (North Holland, Amsterdam, 1996), p. 49.

2. *Particle Dark Matter Review* in *Dark Matter in Cosmology, Quantum Measurements, Experimental Gravitation*, , edited by R. Ansari, Y. Giraud-Heraud, and J. Tran-Than-Van (Editions Frontieres, Gif sur Yvette, 1996), p. 33.

3. *Future Cosmic Microwave Background Constraints to the Baryon Density* in *Cosmic Abundances*, (with M. Kamionkowski, A. Kosowsky, and D. Spergel) edited by S. Holt and G. Sonneborn (AIP, New York, 1996).

4. *Gamma-Rays from Neutralino Annihilation: Prospects for ACT Detection* in *Proceedings of the Padova Workshop on TeV Gamma-Ray Astrophysics* (with J. Buckley) (World Scientific, Padova, 1995), in press.

5. *Fermion Masses in* $SO(10)$ in *The Proceedings of DPF 1992*, (World Scientific, Singapore, 1993).

Invited Talks

1. *Particle Dark Matter Review*, Moriond Meeting (1996).

2. *Neutdriver*, Tools for SUSY, Annecy, FR (1998).

3. *The SPF Framework*, Tools for SUSY, Lyons, FR (1999).

4. *C++, Swig, and Supersymmetry*, FNAL Computing Techniques Seminar (July 1999).

Software Experience

- Languages and Tools
  - C/C++
  - Python
  - Perl
  - TEX/LATEX
  - HTML
  - Postscript
- Recent Projects
  - DIENST protocol server and associated document library middleware. Implemented as a Python library and a set of scripts. DIENST is layered over HTTP, so the visible product is a set of CGI applications. The middle layer organizes access to an online document collection and provides the foundation for the CGI applications.
  - GNU Scientific Library. Reponsible for special functions, interpolation, basic linear algebra, and other modules. Modules are implemented as loosely coupled ANSI C libraries.
  - SPF, a framework for calculations related to supersymmetric dark matter and other more general WIMP calculations. Implemented as a C++ library of fundamental abstractions, wrapped in a Python scripting layer using SWiG, and a set of basic framework components as a Python library.
- Previous Work
  - extensive scientific programming, C/C++
  - generic Postscript API, C++
  - C++ development tools, Perl
  - LATEX document class design