

## Hiroaki NAKANO, Ph.D.

Associate Professor

Program: Fundamental Sciences

Area: Physics

Undergraduate: Dept. of Science

### Research Fields of Interest

Renormalization Group (RG)

- Effective Potential in Quantum Field Theory
- RG Improvement and Multi-Mass Problem
- Infra-Red Fixed Point in Supersymmetric Gauge Theories

Supersymmetry(SUSY)

- Supersymmetric Field Theory
- Supersymmetric Unified Models of Elementary Particles
- SUSY Breaking in Particle Physics

Orbifold String Models

- Anomalous  $U(1)$  Gauge Symmetries
- Fayet-Iliopoulos  $D$ -Term
- Heterotic and Type I models

Origin of the Yukawa Hierarchy

- Anomalous  $U(1)$  Gauge Symmetries
- Superconformal Gauge Dynamics
- Supersymmetric Flavor Problem

Warped Extra Dimension

- Field Localization in Randall-Sundrum
- Geometry
- Bulk Standard Model

### Education

1992: Doctor Degree (Science), Graduate School, Kyoto University, Japan

1989: Master Science Degree, Graduate School, Kyoto University, Japan

1987: Bachelor Physics Degree, Graduated from Dept. of Physics, Kyoto University, Japan

### Major Publications

#### Papers

- [1] "Soft Supersymmetry Breaking at Heavy Chiral Threshold", Hiroyuki Matsuura, Hiroaki Nakano, Koichi Yoshioka, Progress of Theoretical Physics, Vol.117, pp.395 - 400(2007)
- [2] "Induced Top Yukawa Coupling and Reduced Higgs Mass Parameters", Tatsuo Kobayashi, Hiroaki Nakano, Haruhiko Terao, Physical Review D, Vol.71, pp.115009-1 - 115009-10(2005)
- [3] "Large Mass Scale by Strong Gauge Dynamics with Infrared Fixed Point", Tatsuo Kobayashi, Hiroaki Nakano, Haruhiko Terao, Yoshihisa Yamada, Progress of Theoretical Physics, Vol.113, pp.413 - 427(2005)
- [4] "Anomalous  $U(1)$  D-Term Contribution in Type I String Models", Tetsutaro Higaki, Yoshiharu Kawamura, Tatsuo Kobayashi, Hiroaki Nakano, Physical Review D, Vol.69, pp.086004-1 - 086004-9(2004)
- [5] "Nonperturbative Kähler Potential, Dilaton Stabilization and Fayet-Iliopoulos Term", Tetsutaro Higaki, Yoshiharu Kawamura, Tatsuo Kobayashi, Hiroaki Nakano, Physics Letters B, Vol.582, pp.257 - 262(2004)
- [6] "New Approach to SUSY Flavor Problem via

Superconformal Gauge Dynamics", H. Nakano, in "Strong Coupling Gauge Theories and Effective Field Theories" ed. M.Harada, Y. Kikukawa and K. Yamawaki, pp.312-318(2003)

[7] "Flavor Violation in Supersymmetric Theories with Gauged  $U(1)$  Flavor Symmetries", Tatsuo Kobayashi, Hiroaki Nakano, Haruhiko Terao, Koichi Yoshioka, Progress of Theoretical Physics, Vol.110, pp.247 - 267(2003)

[8] "Yukawa Hierarchy Transfer Based on Superconformal Dynamics and Geometrical Realization in String Models", Tatsuo Kobayashi, Hiroaki Nakano, Tatsuya Noguchi, Haruhiko Terao, Journal of High Energy Physics, Vol.302, pp.022-0 - 022-12(2003)

[9] "Sfermion Mass Degeneracy, Superconformal Dynamics and Supersymmetric Grand Unified Theories", Tatsuo Kobayashi, Hiroaki Nakano, Tatsuya Noguchi, Haruhiko Terao, Physical Review D, Vol.66, pp.095011-1 - 095011-11(2002)

[10] "Yukawa Hierarchy Transfer from SC sector and Degenerate Sfermion Masses", Tatsuo Kobayashi, Hiroaki Nakano, Haruhiko Terao, Physical Review D, D65, pp.015006-1 - 015006-6(2001)

[11] "Bulk Standard Model in the Randall-Sundrum Background", Sanghyeon Chang, Junji Hisano, Hiroaki Nakano, Nubuchika Okada, Masahiro Yamaguchi, Physical Review D, Vol.62, pp.84025 - 84040(2000)

[12] "Effective Theory Description of Anomalous  $U(1)$  Supersymmetry Breaking and its Embedding into Supergravity", Aatsuchi Kageyama, Hiroaki Nakano, Takaaki Ozeki, Yoshiaki Watanabe, Progress of Theoretical Physics, Vol.101, pp.439 - 457(1999)

[13] "Anomalous  $U(1)$  Symmetry in Orbifold String Models", Tatsuo Kobayashi, Hiroaki Nakano, Nuclear Physics B, Vol.496, pp.103 - 131(1997)

[14] "Scalar Mass Universality, Anomalous  $U(1)$  and  $R$  Symmetries", Hiroaki Nakano, Progress of Theoretical Physics Supplement, Vol.123, pp.387 - 395(1996)

[15] "Nontriviality of Gauge-Higgs-Yukawa System and Renormalizability of Gauged NJL Model", Masayasu Harada, Yoshio Kikukawa, Taichiro Kugo, Hiroaki Nakano, Progress of Theoretical Physics, Vol.92, pp.1161 - 1184(1994)

[16] "Improving the Effective Potential, Multimass Problem and Modified Mass Dependent Scheme", Hiroaki Nakano, Yusuke Yoshida, Physical Review D, Vol.49, pp.5393 - 5407(1994)

[17] "A Handy Calculating Method of Higgs Potential in SUSY Model", Masako Bando, Nobuhiro Maekawa, Hiroaki Nakano, Joe Sato, Modern Physics Letters A, Vol.8, pp.2729 - 2736(1993)

[18] "Improving the Effective Potential: Multimass Scale Case", Masako Bando, Taichiro Kugo, Nobuhiro Maekawa, Hiroaki Nakano, Progress of Theoretical Physics, Vol.90, pp.405 - 418(1993)

[19] "Improving the Effective Potential", Masako Bando, Taichiro Kugo, Nobuhiro Maekawa, Hiroaki Nakano, Physics Letters B, Vol.301, pp.83 - 89(1993)

[20] "Why is Top heavier than Bottom? Yukawa and Mass Unification in SUSY Model", Masako Bando, Taichiro Kugo, Nobuhiro Maekawa, Hiroaki Nakano, Modern Physics Letters A, Vol.7, pp.3379 - 3390(1992)

[21] "Critical Instability in terms of Renormalization Group

Equation", Masako Bando, Taichiro Kugo, Nobuhiro Maekawa, Hiroaki Nakano, Physical Review D, Vol.44, pp.R2957 - R2961(1991)

## Books

[1] "Elementary particles in extra dimensions", Masako Bando, Hiroaki Nakano, Kyouritsu (2001), 72