Hidetoshi Awata   Associate Professor

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Membership of academic societies:

The Mathematical Society of Japan

Research Interest:

- Quantum field theory
- Representation theory of infinite dimensional algebras
- Symmetric function

Research Summary:

H. Awata works in the areas of representation theory and quantum field theory, which involve the representation theory of infinite dimensional algebras such as Virasoro algebra, W algebra and affine Lie algebra and also involve the quantum field theories possessing one of these algebras as a symmetry such as super string theory, conformal field theory, two dimensional solvable model and topological field theory. Much of his work focuses on studying (q-deformed) Knizhnik-Zamolodchikov equation, Jack polynomial, Macdonald polynomial and Nekrasov's partition function. He is currently focusing on a study of the AGT conjecture, which reveals the relation between the conformal field theory and the Nekrasov's partition function.

Major Publications:

[1] with Akihiro Tsuchiya and Yasuhiko Yamada, "Integral formulas for the WZNW correlation functions," Nuclear Physics **B365** (1991), 680–696.

[2] with Satoru Odake and Jun'ichi Shiraishi, "Free Boson realization of $U_q(\widehat{sl_N})$," Communications in Mathematical Physics **162** (1994), 61–83

[3] with Masafumi Fukuma, Yutaka Matsuo and Satoru Odake, "Representation Theory of the $\mathcal{W}_{1+\infty}$ Algebra," Progress of Theoretical Physics, Supplement **118** (1995), 343–373

[4] with Harunobu Kubo, Satoru Odake and Jun'ichi Shiraishi, "Quantum W_N Algebras and Macdonald Polynomials," Communications in Mathematical Physics **179** (1996), 401–416

[5] with Miao Li, Djordje Minic and Tamiaki Yoneya, "On the Quantization of Nambu Brackets," Journal of High Energy Physics 0102 (2001) 013

[6] with Hiroaki Kanno, "Instanton counting, Macdonald function and the moduli space of D-branes," Journal of High Energy Physics 0505 (2005) 039.

[7] with Yasuhiko Yamada, "Five-dimensional AGT Conjecture and the Deformed Virasoro Algebra," Journal of High Energy Physics 1001 (2010) 125.

[8] with Boris Feigin and Jun'ichi Shiraishi, "Quantum Algebraic Approach to Refined Topological Vertex", Journal of High Energy Physics 1203 (2012) 041.

Education and Appointments:

- 1993   Soryushi-Syogakkai fellow at Yukawa Institute for Theoretical Physics, Kyoto University
- 1994   JSPS fellow at Research Institute for Mathematical Science, Kyoto University
- 1995   JSPS fellow at Yukawa Institute for Theoretical Physics, Kyoto University
- 1996   Visiting Scholar at Enrico Fermi and James Frank Institutes of Chicago University
- 1998   COE at Yukawa Institute for Theoretical Physics, Kyoto University
- 1999   Associate Professor at Graduate School of Mathematics, Nagoya University

Message to Prospective Students:

- The basic literature,

  J. Polchinski, "String Theory", Cambridge univ. press, 1998.

  V. Kac, "Infinite dimensional Lie algebras", Cambridge univ. press, 1990.

  I.G. Macdonald, "Symmetric functions and Hall polynomials", Second Edition, Oxford University Press, 1995.