

International Conference

# Algebraic Analysis of Differential Equations

— from Microlocal Analysis to Exponential Asymptotics —

*in honor of Prof. Takahiro KAWAI on the occasion of his sixtieth birthday*

July 7 (Thu) – July 14 (Thu), 2005

Lecture Hall (Room No. 420) of RIMS (for July 7, 8),

International Conference Hall of the Clock Tower (for July 11–14),  
Kyoto University

Scientific Committee :

M. Kashiwara (RIMS, Kyoto Univ.), T. Miwa (Kyoto Univ.),

Y. Takei (RIMS, Kyoto Univ.)

Organizers :

T. Aoki (Kinki Univ.), T. Koike (Kyoto Univ.), H. Majima (Ochanomizu Univ.),

Y. Okada (Chiba Univ.), Y. Takei (RIMS, Kyoto Univ.), N. Tose (Keio Univ.)

*Contact : Y. Takei (takei@kurims.kyoto-u.ac.jp)*

Invited Speakers :

T. Aoki (Kinki Univ.), C. M. Bender (Washington Univ.),

L. Boutet de Monvel (Univ. de Paris VI),

O. Costin (Rutgers Univ. & Ohio State Univ.), E. Delabaere (Univ. d'Angers),

L. Ehrenpreis (Temple Univ.), C. J. Howls (Univ. of Southampton),

K. Iwasaki (Kyushu Univ.), M. Jimbo (Univ. of Tokyo),

M. Kashiwara (RIMS, Kyoto Univ.), K. Kataoka (Univ. of Tokyo),

T. Kawai (RIMS, Kyoto Univ.), Y. Laurent (Univ. de Grenoble),

G. Lebeau (Univ. de Nice-Sophia Antipolis), G. Nakamura (Hokkaido Univ.),

S. Ōuchi (Sophia Univ.), F. Pham (Univ. de Nice-Sophia Antipolis),

A. Shudo (Tokyo Metropolitan Univ.), H. J. Silverstone (Johns Hopkins Univ.),

J. Sjöstrand (Ecole Polytechnique), H. Tahara (Sophia Univ.),

Y. Takei (RIMS, Kyoto Univ.), G. Uhlmann (Univ. of Washington),

A. Voros (CEA Saclay), M. Yoshino (Hiroshima Univ.).

This conference is sponsored by the Research Institute for Mathematical Sciences, Kyoto University and supported also by Kyoto University 21st Century COE Program 'Formation of an International Center of Excellence in the Frontiers of Mathematics and Fostering of Researchers in Future Generations'.

# Program

## July 7, Thursday

- 13:30 – 14:30 Johannes Sjöstrand (Ecole Polytechnique)  
Spectral instability for non-self-adjoint operators
- 15:00 – 16:00 Kiyoomi Kataoka (Univ. of Tokyo)  
Boundary value problems with fractional power singularities
- 16:30 – 17:30 Yves Laurent (Univ. de Grenoble)  
Inverse image of D-modules and weighted b-functions

## July 8, Friday

- 9:30 – 10:30 Gen Nakamura (Hokkaido Univ.)  
Inverse problem for reconstructing medium singularity
- 10:45 – 11:45 Leon Ehrenpreis (Temple Univ.)  
The edge of the wedge theorem
- 13:15 – 14:15 Gilles Lebeau (Univ. de Nice-Sophia Antipolis)  
The hypoelliptic Laplacian of J.-M. Bismut
- 14:30 – 15:30 Hidetoshi Tahara (Sophia Univ.)  
Coupling of two partial differential equations and its application

## July 11, Monday

- 10:00 – 11:00 Louis Boutet de Monvel (Univ. de Paris VI)  
Logarithmic trace of Szegö and Toeplitz projectors
- 11:30 – 12:30 Michio Jimbo (Univ. of Tokyo)  
Correlation functions in solvable lattice models: history and recent advances
- 14:00 – 15:00 Masaki Kashiwara (RIMS, Kyoto Univ.)  
Codimension three conjecture for holonomic modules
- 15:45 – 16:45 Takahiro Kawai (RIMS, Kyoto Univ.)  
Virtual turning points — A gift of microlocal analysis to the exact WKB analysis  
(Joint work with T. Aoki, T. Koike, Y. Nishikawa, S. Sasaki, A. Shudo and Y. Takei)
- 17:30 – < Party >

## July 12, Tuesday

- 9:30 – 10:30 Takashi Aoki (Kinki Univ.)  
Exact WKB analysis via computers  
(Joint work with N. Honda and T. Koike)
- 11:00 – 12:00 Gunther Uhlmann (Univ. of Washington)  
Boundary rigidity and the Dirichlet-to-Neumann map
- 13:30 – 14:30 André Voros (CEA Saclay)  
From exact-WKB towards singular quantum perturbation theory
- 15:00 – 16:00 Frédéric Pham (Univ. de Nice-Sophia Antipolis)  
A baby physicist's view of Feynman path integrals
- 16:30 – 17:30 Carl M. Bender (Washington Univ. in St. Louis)  
Ghost busting: Making sense of non-Hermitian Hamiltonians

## July 13, Wednesday

- 9:30 – 10:30 Sunao Ōuchi (Sophia Univ.)  
The behaviors of singular solutions of some partial differential equations  
in the complex domain
- 11:00 – 12:00 Ovidiu Costin (Rutgers Univ. & Ohio State Univ.)  
Borel summability and rigorous WKB for partial differential equations
- 13:30 – 14:30 Harris J. Silverstone (Johns Hopkins Univ.)  
Some observations on the JKWB treatment of the quadratic barrier
- 15:00 – 16:00 Eric Delabaere (Univ. d'Angers)  
Resurgent reduction near a simple turning point
- 16:30 – 17:30 Akira Shudo (Tokyo Metropolitan Univ.)  
A role of new Stokes curves in the quantized Henon map

## July 14, Thursday

- 9:30 – 10:30 Masafumi Yoshino (Hiroshima Univ.)  
WKB analysis and small denominators for vector fields
- 11:00 – 12:00 Christopher J. Howls (Univ. of Southampton)  
Recent developments in exponential asymptotics for nonlinear partial  
differential equations
- 13:30 – 14:30 Katsunori Iwasaki (Kyushu Univ.)  
Bounded trajectories in the sixth Painlevé dynamics
- 15:00 – 16:00 Yoshitsugu Takei (RIMS, Kyoto Univ.)  
Instanton-type formal solutions for the first Painlevé hierarchy

## Schedule

	Morning		Afternoon		
July 7			J. Sjöstrand	K. Kataoka	Y. Laurent
July 8	G. Nakamura	L. Ehrenpreis	G. Lebeau	H. Tahara	
July 11	L. Boutet de Monvel	M. Jimbo	M. Kashiwara	T. Kawai	< Party >
July 12	T. Aoki	G. Uhlmann	A. Voros	F. Pham	C.M. Bender
July 13	S. Ōuchi	O. Costin	H.J. Silverstone	E. Delabaere	A. Shudo
July 14	M. Yoshino	C.J. Howls	K. Iwasaki	Y. Takei	