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Edited by Brian Davies and Yuri Safarov

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Spectral Theory and Geometry

ICMS Instructional Conference

Edinburgh, 30 March – 9 April 1998

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Preface

The ICMS Instructional Conference between 30 March and 9 April 1998 was one of a series of highly successful such conferences held under the auspices of the International Centre of Mathematical Sciences in Edinburgh, Scotland. Some of these meetings have been held in the house where Maxwell was born, which is now the ICMS administrative headquarters. The lectures for larger meetings, such as this one, were in the James Clerk Maxwell Building of the University of Edinburgh in a different part of the city. Accommodation for the meeting was provided for all speakers and audience in the Pollock Halls of Residence belonging to the University and providing a refreshing twenty minute walk to and from the lectures.

The subject of this meeting was Spectral Theory and Geometry, and the format followed that of earlier meetings. Twelve principal speakers were invited to give lecture courses of three hours each, graded into three levels, Introductory, Medium and Advanced (see the list below). There were several exchanges before the meeting about the contents of the introductory lectures, since these had to provide the core material for all of the later courses. These were all given by world experts, who provided organised surveys of their fields, with proofs in many cases. This volume contains articles by most of the lecturers. Many of these go beyond what they could present within the time limits of the conference, and we are most grateful to them for undertaking the considerable amount of work involved in producing the lecture notes.

The organisers of the meeting, Professors E B Davies and Y Safarov, acknowledge with thanks the advice received from the Scientific Panel, namely Professors I Chavel, P Sarnak and J Sjöstrand. We would also particularly like to thank Mrs Tracey Dart, who took over as Administrator of the ICMS at a crucial stage in the organisation, and Mrs Julie Brown; both of them made an enormous contribution to the success of the meeting. Finally we must thank Professor E G Rees, without whom it would never have got started.

We acknowledge with thanks the several organisations which provided funding for the meeting. These were the European Union, The Engineering and Physical Sciences Research Council (grant number GR/L52536), The London Mathematical Society, and the ICMS itself.

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Introductory courses:

F E Burstall, *Basic Riemannian geometry*

I Chavel, *The Laplacian on Riemannian manifolds*

E B Davies, *Computational spectral theory*

Medium level courses:

M Ashbaugh, *Isoperimetric and universal inequalities for eigenvalues*

A Grigor'yan, *Estimates of heat kernels on Riemannian manifolds*

M Shubin, *Spectral theory of the Schrödinger operators on non-compact manifolds: qualitative results*

D Vassiliev, *Spectral asymptotics of fractals*

Advanced courses:

Y Colin de Verdière, *Spectral theory of graphs*

R Melrose, *Pseudodifferential operators, contact manifolds and index theory*

A Voros, *Quantum resurgence*

S Zelditch, *Lectures on wave invariants*

M Zworski, *Resonances in geometry and mathematical physics: an introduction*

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