

Application for a short visit MISGAM grant

Applicant: Boris Botvinnik

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Host: Boris Dubrovin

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Project Description:

During my visit it is proposed to discuss some recent results on positive scalar curvature, conformal geometry and moduli spaces. As a part of this discussion it is proposed to give the following mini-course:

Title: Positive scalar curvature, conformal geometry and moduli spaces.

Abstract: We will start with basic tools used for positive scalar curvature: Gromov-Lawson technique, index of Dirac operator and conformal geometry. One of the basic topological idea here is to use surgery, this allows to change topology of manifold keeping positivity of a scalar curvature. I would like to explain several applications:

- (1) solving Gromov-Lawson conjecture
- (2) studying the Yamabe invariant
- (3) studying topology of the moduli space of positive scalar curvature metrics;
- (4) recent results and conjectures.

Curriculum Vitae:

Name: Boris I Botvinnik

Birth: March 14, 1955, Khabarovsk, Russia

Current Address:

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Bures-sur-Yvette, France

Thesis: Geometric and algebraic properties of the Adams-Novikov spectral sequence for symplectic manifolds (Sobolev Institute of Mathematics, Novosibirsk, Russia, 1984)

Recent Academic Positions:

Associate Professor	University of Oregon	1993-2004
Professor	University of Oregon	2004-Present

Recent Visiting Positions:

Research Fellow	American Institute of Mathematics	June-July, 2007
Guest Professor	Royal Institute of Technology, Stockholm	Sept-Dec 2007
Research Fellow	Institute des Hautes Etudes Scientifiques	Dec 2007-Feb 2008

Publications Most Relevant to Proposed Work:

- The relative Yamabe invariant, *Comm. Anal. Geom.* (2002) v. 10, 925-954. with Kazuo Akutagawa
- Manifolds of positive scalar curvature and conformal cobordism theory, *Math. Ann.* 324 (2002), no. 4, 817–840, with Kazuo Akutagawa
- Yamabe metrics on cylindrical manifolds, *Geom. Funct. Anal.* 13 (2003), no. 2, 259–333, with Kazuo Akutagawa
- The Yamabe invariant for non-simply connected manifolds. *J. Differential Geom.* 62 (2002), no. 2, 175–208 with Jonathan Rosenberg.
- The Weyl functional near the Yamabe invariant, *J. Geom. Anal.* 13 (2003), no. 1, 1–20, with Kazuo Akutagawa, Harrish Seshadri and Osama Kobayashi
- The Yamabe invariant of orbifolds and L^2 -harmonic spinors, *J. Reine Angew. Math.* 574 (2004), 121–146, with Kazuo Akutagawa
- Positive scalar curvature for manifolds with elementary abelian fundamental group, *Proc. Amer. Math. Soc.* 133 (2005), no. 2, 545–556, with Jonathan Rosenberg.