Scientific report on VBAC2012
Conference on Geometry and Quantization of Moduli Spaces

an ITGP midterm activity

Centre de Recerca Matemàtica, Bellaterra (Barcelona), 18–22 June, 2012

Integrated in the Research Programme
Geometry and Quantization of Moduli Spaces
CRM, Barcelona, March–June 2012

1. Summary

The conference was the final activity of the Research Program "Geometry and Quantization of Moduli Spaces", which took place in the CRM (Centre de Recerca Matemàtica, Bellaterra, Barcelona) from March to June 2012. It constituted also the 2012 workshop of the international research group VBAC (Vector Bundles on Algebraic Curves). The aim of this series of workshops is to present state-of-the-art lectures on some theme related to the activities of the group and at the same time to allow researchers in the area (especially early stage researchers) to present their work in the form of 30 minute contributed talks.

The talks on this occasion were especially related to the geometry and quantisation of moduli spaces. Several aspects of Quantum Field Theory were covered, as were Higgs bundles and representations, quiver moduli and Gromov-Witten theory. Many of the talks were related to physics.

There were 88 registered participants.

Web page of the activity: `http://www.crm.cat/cmodulispaces/`

2. Description of the scientific content and discussion at the event

The Conference consisted of the following lectures:

Plenary talks.

- Jorgen Andersen: *The geometric construction of the Reshetikhin-Turaev topological quantum field theory.*
- Dan Freed: *Equivariant de Rham theory revisited.*
- João Nunes: *Geometric quantization: some of the old and some of the new.*
- Olivier Guichard: *The Zariski closure of Hitchin representations and of positive representations.*
- Nigel Hitchin: *Hyperholomorphic bundles on moduli spaces.*
- Kobi Kremnitzer: *Factorisations algebras and QFTs.*
- Julien Marché: *Semi-classical description of the colored Jones polynomials.*
- Tony Pantev: *Shifted symplectic structures and quantization.*
- Jacopo Stoppa: *A degeneration formula for quiver moduli and its Gromov-Witten equivalent.*
- Gang Tian: *Compactifying the moduli of Kähler-Einstein metrics.*
- Nathalie Wahl: *Moduli space as universal operations on the Hochschild complex of open field theories.*
- Richard Wentworth: *Gluing formulas for determinants of Dolbeault laplacians on Riemann surfaces.*
- Chris Woodward: *Mundet stability and mirror symmetry.*

Contributed talks.

- Oren Ben-Bassat: *Sub-varieties and Descent.*
- Alessia Mandini: *Polygon spaces and an involution on the moduli space of parabolic Higgs bundles.*
- Pablo Solis: *Compactifications of loop groups and bundles on Riemann surfaces.*
- Szilárd Szábo: *Star shaped quivers and spectral curves.*
- Pietro Tortella: *Nijenhuis structures and λ-connections.*
- Alfonso Zamora: *A GIT characterization of the Harder-Narasimhan fltration.*

3. Assessment of the results and impact of the event on the future direction of the field

The plenary talks were state-of-the art lectures on many important topics in this field. The large number of participants will have taken away many good ideas. The contributed talks (and many of the plenary talks) covered work in progress and discussions arising from them will have influence on future developments.

4. Final program of the meeting

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<tr><th></th><th>Monday
18 June</th><th>Tuesday
19 June</th><th>Wednesday
20 June</th><th>Thursday
21 June</th><th>Friday
22 June</th></tr>
<tr><td>10:30-11:30</td><td>Freed</td><td>Guichard</td><td>Andersen</td><td>Tian</td><td>Pantev</td></tr>
<tr><td>11:30-12:00</td><td>coffee/tea</td><td>coffee/tea</td><td>coffee/tea</td><td>coffee/tea</td><td>coffee/tea</td></tr>
<tr><td>12:00-13:00</td><td>Woodward</td><td>Marché</td><td>Tortella
Solis</td><td>Kremnitzer</td><td>Hitchin</td></tr>
<tr><td>13:00-14:00</td><td>lunch</td><td>lunch</td><td>lunch</td><td>lunch</td><td>lunch</td></tr>
<tr><td>15:00-15:30</td><td>Mandini</td><td rowspan="2">Stoppa</td><td rowspan="4">EXCURSION
AND
DINNER</td><td>Ben–Bassat</td><td rowspan="4"></td></tr>
<tr><td>15:30-16:00</td><td>Szabó</td><td></td></tr>
<tr><td>16:30-17:30</td><td>Nunes</td><td>Wahl</td><td>Wentworth</td></tr>
<tr><td>17:45-18:15</td><td>Zamora</td><td></td><td></td></tr>
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