

# CASIMIR

## ESF Research Networking Programme

### New Trends and Applications of the Casimir Effect

Proposers: Astrid Lambrecht (ENS, Univ. Paris 6, France)

Michael Bordag (Univ. Leipzig, Germany)

Giovanni Carguno (INFN Padova, Italy)



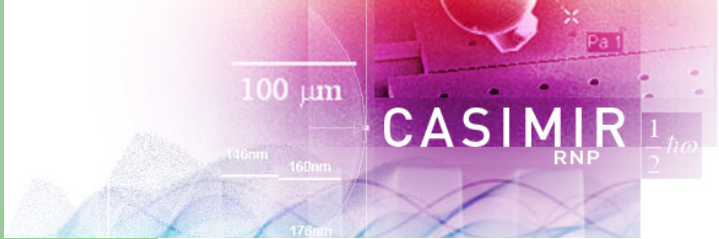
100  $\mu\text{m}$   
136nm  
160nm  
170nm  
Pa 1  
CASIMIR  
RNP  
 $\frac{1}{2} h\omega$

# CASIMIR

**Duration: 5 years from April 2008 to April 2013**

**Budget : 95 k€ per year**

**for conferences, workshops, schools,...  
grants (exchange and short term visits)  
website  
publications and publicity  
steering committee meetings**



# Participating Groups

**At present the network involves**

**40 groups from**

**11 European and pan-European countries**

**Austria:**

**Markus Arndt**, Vienna University

**Jörg Schmiedmayer**, Vienna University

**France:**

**Philippe Andreucci**, CEA, Grenoble

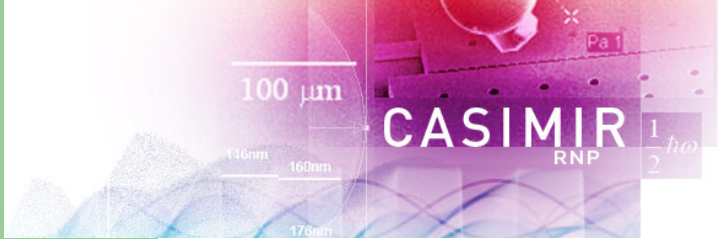
**Joël Chevrier**, CNRS, Univ. of Grenoble

**Bertrand Duplantier**, CEA, Saclay

**Astrid Lambrecht**, CNRS, ENS, Univ. Paris 6

**Valery Nesvizhevsky**, Institute Laue Langevin, Grenoble

**Serge Reynaud**, CNRS, ENS, Univ. Paris 6



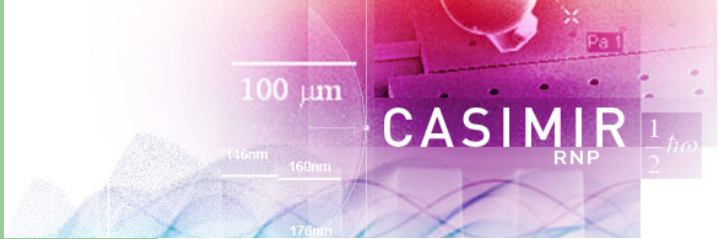
# Participating Groups

## Germany:

**Michael Bordag**, University of Leipzig  
Thorsten Emig, University of Cologne  
Holger Gies, University of Jena  
Carsten Henkel, University of Potsdam  
Andreas Wirzba, Forschungszentrum Jülich

## Italy:

Guiseppe Bimonte, University of Naples  
Enrico Calloni, University of Naples  
**Giovanni Carugno**, INFN Padova  
Lev Pitaevskii, Trento University  
Luigi Rosa, Naples University  
Giuseppe Ruoso, INFN Legnaro  
Sandro Stringari, Trento University



# Participating Groups

## Mexico:

**Raul Esquivel-Sirvent**, University of Mexico City via

**REGINA** : Mexican funded network promoting collaborative projects in Nanoscience and Nanotechnology within UNAM and abroad

## Netherlands:

**Davide Iannuzzi**, Vrije Universiteit, Amsterdam

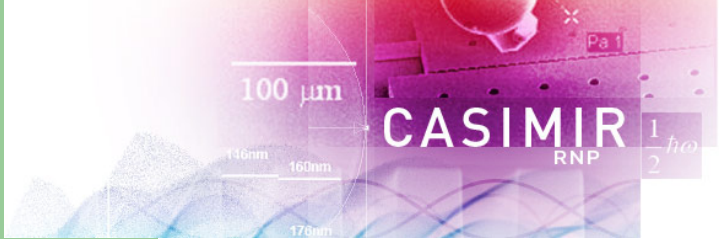
Georges Palasantzas, University of Groningen

Vitaly Svetovoy, University of Twente

## Norway:

**Iver Brevik**, Norwegian University of Science & Technology, Trondheim

Johan Høy, Norwegian University of Science & Technology, Trondheim



# Participating Groups

## Portugal:

**Ariel Guerriero**, University of Porto  
Carlos Herdeiro, University of Porto  
José Tito Mendonça, ITS Lisbon

## Spain:

Manuel Asorey, University of Zaragoza  
**Emilio Elizalde**, University of Barcelona  
Jaume Haro, Technical University of Catalonia (UPC)  
Juan Mateos-Guilarte, University of Salamanca  
Sergei D. Odintsov, Univ. of Barcelona  
Enrique Ruiz-Arriola, Granada University  
Lorenzo-Luis Salcedo, Granada University

## Switzerland:

**Markus Buttiker**, Geneva University  
Philippe Martin, Ecole Polytechnique Fédérale de Lausanne



# Participating Groups

## United Kingdom:

Gabriel Barton, University of Sussex

**Chris Binns**, University of Leicester

Stefan Buhmann, Stefan Scheel, Imperial College, London

Rami Golestanian, University of Sheffield

Clive Speake, University of Birmingham

Mike Ward, University of Birmingham

The network is open and one of the central aims for ESF is to enlarge our community

Application for other instruments such as  
**EUROCORES**

# Core Topics (1)

## 1) Casimir effect: measurement and theory

Thermal Casimir effects (in and out of thermal equilibrium)

Clarify theory

Casimir force in complex geometries and novel topologies

Control of Casimir force & applications to NEMS

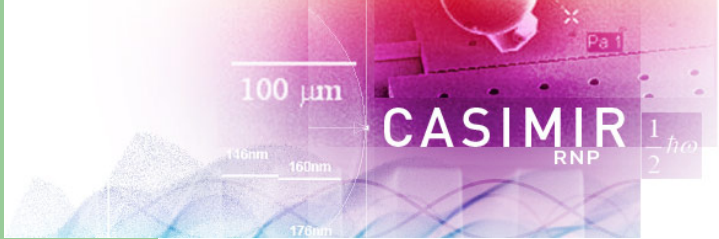
Patterned or corrugated surfaces

Nanospheres or small spheroid shaped bodies

Edge effects

Vacuum torque acting on anisotropic or structured bodies

Beyond PFA measurements and calculations



# Core Topics (2)

## 1) Casimir effect: measurement and theory

New materials and their optical properties

Control of Casimir force & applications to NEMS

Carbon nanotubes

Nanoparticles

Metamaterials

Quasicrystals

Superconductors

Photonic crystals...

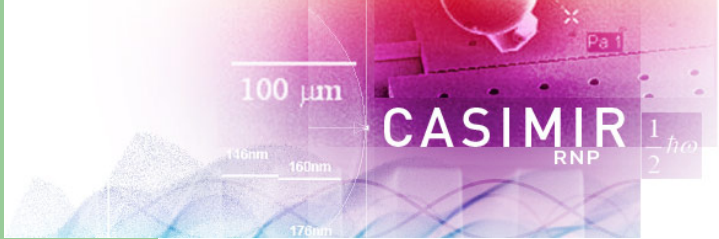
Repulsive & lateral Casimir forces

Applications in and cross-links with nanophysics, biophysics, disordered systems...



## Core Topics (3)

- 2) Dynamical Casimir effect, Unruh effect, vacuum friction and decoherence
- 3) New challenges in vacuum properties
  - Casimir effect, vacuum energy, gravity and cosmology
  - Casimir effect and tests of the equivalence principle
  - Casimir and Yukawa type forces



## Core Topics (3)

### 4) Side topics

Interactions with other fields

van der Waals forces

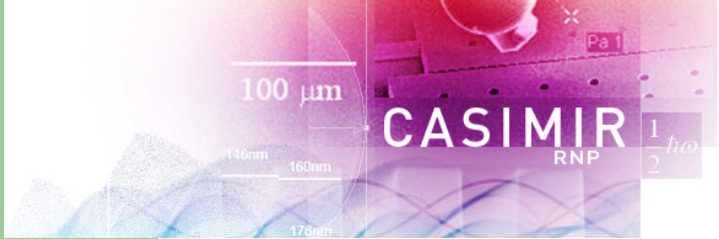
dispersion forces in liquids

Casimir Polder interaction with BEC and molecules

# Support from CASIMIR network

## Short visit grants

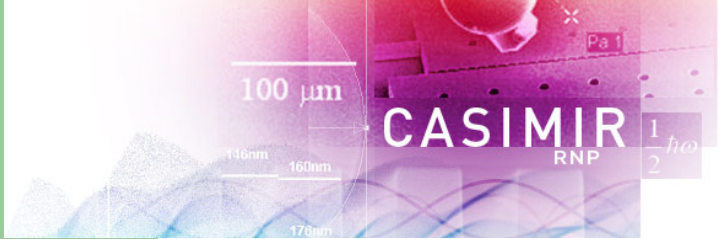
- Covers a period up to 15 days
- Sponsored preferentially between programme participants
- If you want to apply for funding of a short term research visit, please use the [application form](#) on the [ESF page for CASIMIR](#).
- Provide a short description of the proposed project work (about 250 words) and the duration of the stay.
- The steering committee will receive applications for short grants continuously and take decisions promptly.
- **In any case, please study the [ESF guidelines](#) before applying.**



# Support from CASIMIR network

## Exchange grants

- Covers a duration from 15 days up to 6 months
- Supported preferentially between programme participants.
- .
- If you want to apply for funding of a short term research visit, please use the [application form](#) on the [ESF page for CASIMIR](#).
- Provide a short description of the proposed project work (about 1000 words) and the duration of the stay.
- Exchange grants should be supported by a letter of recommendation from someone familiar with the applicant's work (if appropriate), a letter of acceptance from the receiving institution and a curriculum vitae of two A4 pages.



# Support from CASIMIR network

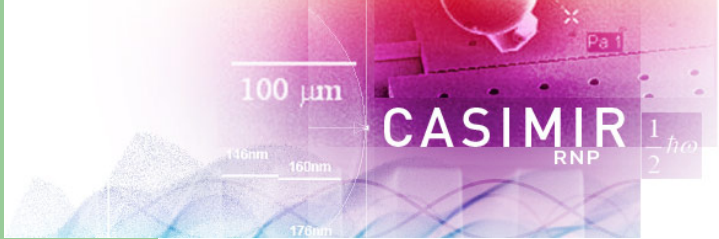
## Exchange grants

- The steering committee will receive applications continuously and take decisions within 1 month for exchange grants.
- In any case, please study the ESF guidelines before applying.

# Support from CASIMIR network

## Science meetings

- Sponsoring of specialised conferences or workshops in the scope of the programme.
- Application for and co-sponsoring of an ESF Research Conference Series bringing together the main European actors as well as American colleagues every two years.
- Follow the tradition of the Euresco conference series and allow for high level scientific meetings inside Europe.
- The CASIMIR network foresees two conferences from the series “Quantum Field Theory under the influence of external conditions” to be held in fall 2009 in Oklahoma and in fall 2011.



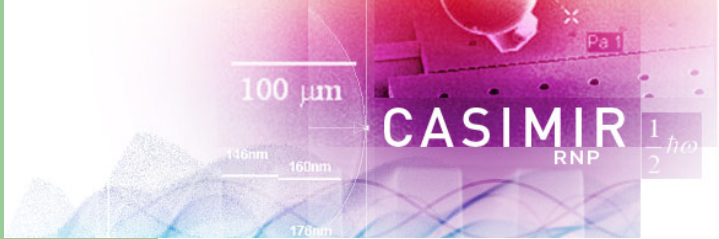
# Support from CASIMIR network

## Science meetings

- In addition co-sponsoring and organizing of small workshops, study centers and conferences, in particular in the years between the ESF conferences, that is in 2008, 2010 and 2012.
- Study centers: gather up to 30 participants for about 6 weeks and would have similar format as the Les Houches Summer Schools.
- Accompanying workshops: gather up to 70 participants for 3-4 days.
- Other workshops which may be sponsored: similar format to the workshop “QED2005” (Les Houches, 2005).
- The steering committee will receive applications continuously and take decisions within 1 month.

Network Meeting, November 29-30, 2008

Royaumont, France



# Program

*Saturday November 29, 2008*

10:50-13:00 1st session: Austria and France (Chair: Astrid Lambrecht)

10:50-11:15 Jörg Schmiedmayer, University of Vienna

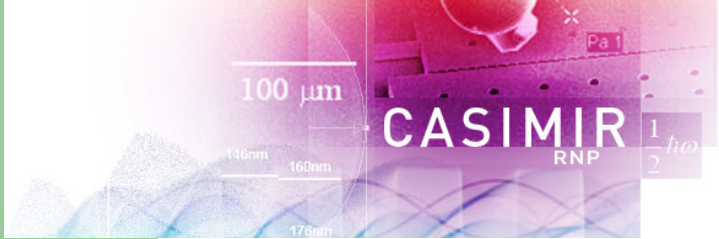
11:15-11:40 Joël Chevrier, Neel Institute Grenoble

11:40-12:05 Bertrand Duplantier, CEA Saclay

12:05-12:30 Valery Nesvizhevsky, ILL Grenoble

12:30-12:55 Serge Reynaud, LKB Paris

Lunch



# Program

*Saturday November 29, 2008*

14:00-15:00 Guided visit of the site including the medieval library

15:00-17:05 2nd session: Germany and Norway (Chair: Davide Iannuzzi)

15:00-15:25 Michael Bordag, University of Leipzig

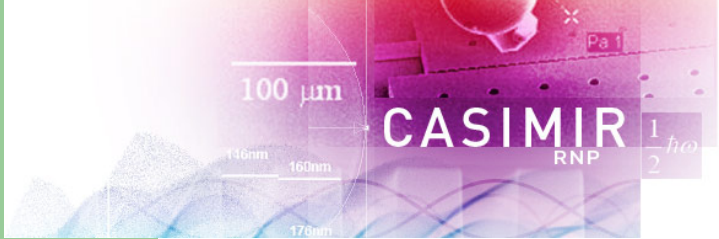
15:25-15:50 Holger Gies, University of Heidelberg

15:50-16:15 Carsten Henkel, University of Potsdam

16:15-16:40 Andreas Wirzba, Forschungszentrum Jülich

16:40-17:05 Iver Brevik, University of Trondheim

Coffee break



# Program

*Saturday November 29, 2008*

17:30-19:30 3rd session: Italy (Chair: Michael Bordag)

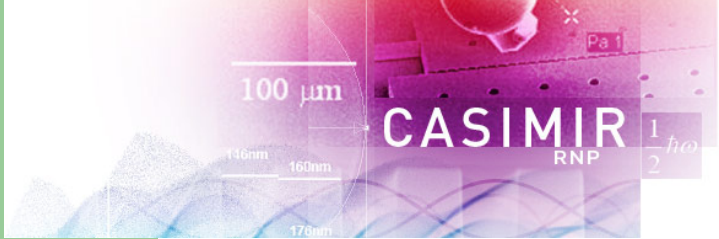
17:30-17:55 Giuseppe Bimonte, University of Naples

17:55-18:20 Lev Pitaevskii, University of Trento

18:20-18:45 Luigi Rosa, University of Naples

18:45-19:10 Giuseppe Ruoso, INFN Legnaro

19:30 Aperitif and Conference Dinner



# Program

*Sunday November 30, 2008*

09:00-11:00 4th session: Mexico, Portugal and Spain (Chair: Giovanni Carugno)

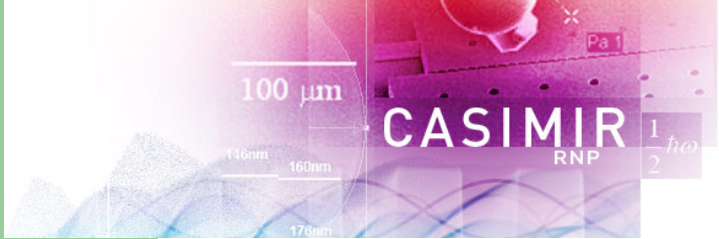
09:00-09:25 Raul Esquivel-Sirvent, University of Mexico

09:25-09:50 Ariel Guerreiro, University of Porto

09:50-10:05 Michael Bordag (replacing Emilio Elizalde, University of Barcelona)

10:05-10:30 Juan Mateos Guilarte, University of Salamanca

Coffee break



# Program

*Sunday November 30, 2008*

11:00-13:00 5th session: United Kingdom (Chair: Ariel Guerreiro)

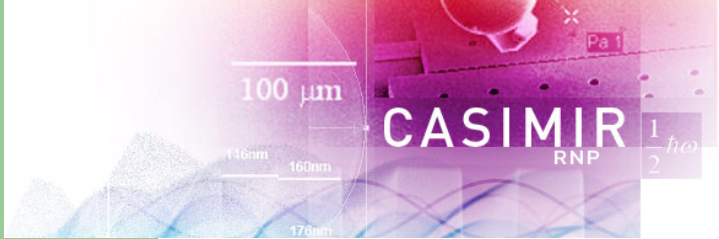
11:00-11:25 Stefan Buhmann, Imperial College, London

11:25-12:50 Rami Golestanian, University of Sheffield

12:50-12:15 Clive Speake, University of Birmingham

12:15-12:40 Mike Ward, University of Birmingham

Lunch



# Program

*Sunday November 30, 2008*

14:15-16:00 6th session: Switzerland and The Netherlands (Chair: Iver Brevik)

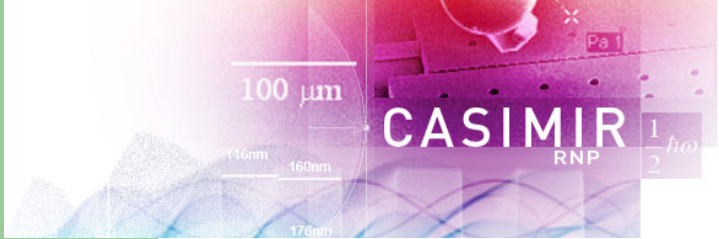
14:15-14:40 Philippe-André Martin, Ecole Polytechnique Fédérale de Lausanne

14:40-15:05 Davide Iannuzzi, Vrije Universiteit Amsterdam

15:05-15:30 George Palasantzas, University of Groningen

15:30-15:55 Vitaly Svetovoy, University of Twente

Closing and Good-bye Coffee



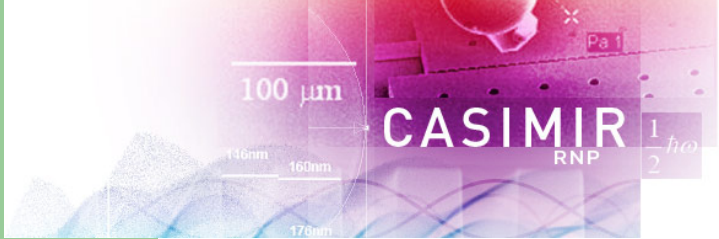
# Departure on Sunday/Monday

Taxis will be leaving at 13h, 14h, 16h15 and 18h on Sunday and at 8h15 on Monday morning.

Please consult the list, you received with your badge, to see on which taxi you are booked.

The departure time is sufficient to catch your flight or train without any problem.

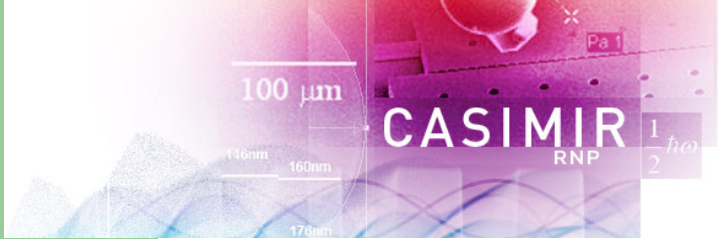
Participants returning to Paris downtown are booked for the taxis leaving at 18h and will be taken to Charles de Gaulle - RER B station from which trains are leaving every 15 minutes.



# Departure on Sunday/Monday

Please keep all your original tickets and receipts.

You should send them within one month after the meeting to Catherine Werner at ESF together with the travel claim form that you received with your badge.



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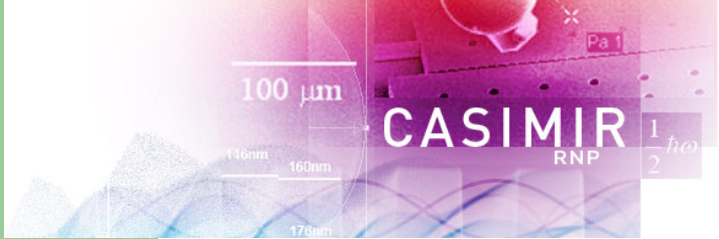
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Lunch



# Announcements

**There will be a guided visit at 4:30am**

**Meeting point is the reception**

**If everybody agrees the talks could be made accessible on the CASIMIR website ([www.casimir-network.com](http://www.casimir-network.com))**