



THE HEBREW UNIVERSITY OF JERUSALEM  
ISRAEL INSTITUTE FOR ADVANCED STUDIES

# Quantum Field Theory, String Theory and Beyond

28 February - 3 March, 2016

All lectures will take place at the Israel Institute for Advanced Studies, Lecture Hall 130,  
on the Edmond J. Safra Campus, Givat Ram

## **Organizers:**

**Ofer Aharony** (Weizmann Institute of Science)  
**Eliezer Rabinovici** (The Hebrew University of Jerusalem)

## **Scientific Committee:**

**Shmuel Elitzur** (The Hebrew University of Jerusalem)  
**Amit Giveon** (The Hebrew University of Jerusalem)  
**Nissan Itzhaki** (Tel Aviv)  
**Zohar Komargodski** (Weizmann Institute of Science)  
**Moshe Moshe** (Technion, Israel Institute of Technology)  
**Shimon Yankielowicz** (Tel Aviv)

# Program

## Sunday, 28 February

- 08:30 - 09:30     Registration - IIAS Lobby
- 09:30 - 09:40  
Welcome - Michal Linial (IIAS Director)
- 09:40 - 10:20     **Curtis Callan** (Princeton University)  
The statistics of diversity in the immune system:  
Of mice and men, T-cells and B-cells
- 10:20 - 11:00     **Andrew Strominger** (Harvard University)  
Infrared structure of Abelian gauge theory
- 11:00 - 11:30     Coffee Break - IIAS Lobby
- 11:30 - 12:10     **Lars Brink** (Chalmers University of Technology)  
Exceptional Symmetries vs. Spacetime Symmetries
- 12:10 - 12:50     **Alexander Polyakov** (Princeton University)  
Impossible Hyperbolae
- 13:00 - 14:30     Lunch - The Belgium House
- 14:30 - 15:10     **Lars Bildsten** (Kavli Institute For Theoretical  
Physics (KITP))  
Hearing the Stars: New Insights into Stellar  
Interiors from Astroseismology
- 15:10 - 15:50     **Hiroshi Ooguri** (Caltech)  
Characterizing the Swampland
- 15:50 - 16:30     **John Iliopoulos** (LPTENS)  
SU(N) gauge theories and non-commutative  
geometry
- 16:30 - 17:00     Coffee Break - IIAS Lobby

- 17:00 - 17:40     **Gary Horowitz** (University of California at Santa Barbara)  
New Insights into Quantum Gravity from Holography
- 17:40 - 18:20     **Spenta Wadia** (TATA Institute of Fundamental Research, Mumbai)  
The S-matrix in Chern-Simons + matter theories
- 19:00 - 21:30     **Dinner at "Modern" Restaurant at the Israel Museum**  
Including a welcome by Hebrew University President Menahem Ben Sasson

**Monday, 29 February**

- 09:30 - 10:10     **Erik Verlinde** (University of Amsterdam)  
Emergent Gravity and the Dark Universe
- 10:10 - 10:50     **Edouard Brezin** (LPTENS)  
45 years after
- 10:50 - 11:20     Coffee Break - IAS Lobby
- 11:20 - 12:00     **Igor Klebanov** (Princeton University)  
The Gross-Neveu Model Above Two Dimensions
- 12:00 - 12:40     **Marc Henneaux** (Université Libre de Bruxelles)  
Hyperbolic Coxeter groups and Hidden Symmetries of Gravity
- 12:40 - 14:10     Lunch - The Belgium House
- 14:10 - 14:50     **Nathan Seiberg** (Institute for Advanced Study, Princeton)  
Gapped Boundary Phases of Topological Insulators via Weak Coupling

- 14:50 - 15:30 **Tom Banks** (University of California, Santa Cruz)  
From Asymptotic Darkness to Holographic Space Time
- 15:30 - 16:00 Coffee Break
- 16:00 - 16:40 **Francois Englert** (Université Libre de Bruxelles)  
On the quantum fate of horizons and the fuzzball hypothesis
- 16:40 - 17:20 **Eliezer Rabinovici** (The Hebrew University of Jerusalem)  
Remarks on geometry singularities and their complexity
- 17:20 - 18:00 Summary of David Gross Birthday Celebration

### Tuesday, 1 March

- 09:30 - 10:10 **Sean Hartnoll** (Stanford University)  
Hydrodynamic theory of phase-fluctuating superconductivity: From vortices to Chern-Simons interactions
- 10:10 - 10:50 **Dieter Lust** (LMU and MPI, Munich)  
Classical and quantum black hole hair
- 10:50 - 11:20 Coffee Break
- 11:20 - 12:00 **Eva Silverstein** (Stanford University)  
Massive particle production and oscillatory non-Gaussianity searches
- 12:00 - 12:40 **Mikhail Shifman** (University of Minnesota)  
Ten-dimensional critical string as a soliton in four-dimensional super-Yang-Mills theory
- 12:40 - 14:00 **Light Lunch - IAS Lobby**

14:00 - 18:00     **Tour of Western Jerusalem and the Mahane  
Yehuda Market**

18:00 - 20:00     **Dinner at Ima Restaurant**

### Wednesday, 2 March

09:15 - 09:55     **Shiraz Minwalla** (TATA Institute of Fundamental  
Research, Mumbai)

A Charged Membrane Paradigm at large D

09:55 - 10:35     **Laurence Yaffe** (University of Washington)

Lessons from Numerical Holography

11:00 - 12:30     **Andrew Strominger** (Harvard University)

Bekenstein Memorial Lecture at Faculty of Physics  
- Black Hole Information Revisited

12:30 - 14:00     Lunch - The Belgium House

14:00 - 15:30     **Nima Arkani-Hamed** (IAS Princeton)

Review: "The Future of Particle Physics"

15:30 - 16:00     Coffee Break - IAS Lobby

16:00 - 16:40     **Kyriakos Papadodimas** (CERN, Geneva)

On black hole horizons and complementarity

16:40 - 17:20     **Daniel Harlow** (Harvard University)

Wormholes, Emergent Gauge Fields, and the Weak  
Gravity Conjecture

### Thursday, 3 March

09:30 - 10:10     **Zohar Komargodski** (Weizmann Institute of  
Science)

Trace Anomalies and the Correlation Functions of  
Coulomb Branch Operators

- 10:10 - 10:50 **Nadav Drukker** (King's College London)  
An Exact prediction of N=4 SUSYM theory for string theory II
- 10:50 - 11:20 Coffee Break - IAS Lobby
- 11:20 - 12:00 **Rajesh Gopakumar** (International Centre for Theoretical Sciences)  
String Theory as a Higher Spin Theory
- 12:00 - 12:40 **Arkady Tseytlin** (Imperial College London )  
Higher spin partition functions and scattering amplitudes
- 12:40 - 14:10 Lunch - The Belgium House
- 14:10 - 15:40 **Leonardo Rastelli** (Yang Institute for Theoretical Physics, Stony Brook University)  
Review : Conformal Bootstrap
- 15:40 - 16:10 Coffee Break - IAS Lobby
- 16:10 - 16:50 **Nikita A. Nekrasov** (Simons Center for Geometry and Physics, Stony Brook University)  
Sewn gauge theories
- 16:50 - 17:30 **Jeffrey Harvey** (University of Chicago)  
What is moonshine trying to tell us?