

strings 2011

UPPSALA JUNE 27-JULY 2

[www.strings2011.se](http://www.strings2011.se)

# OPENING

# REMARKS

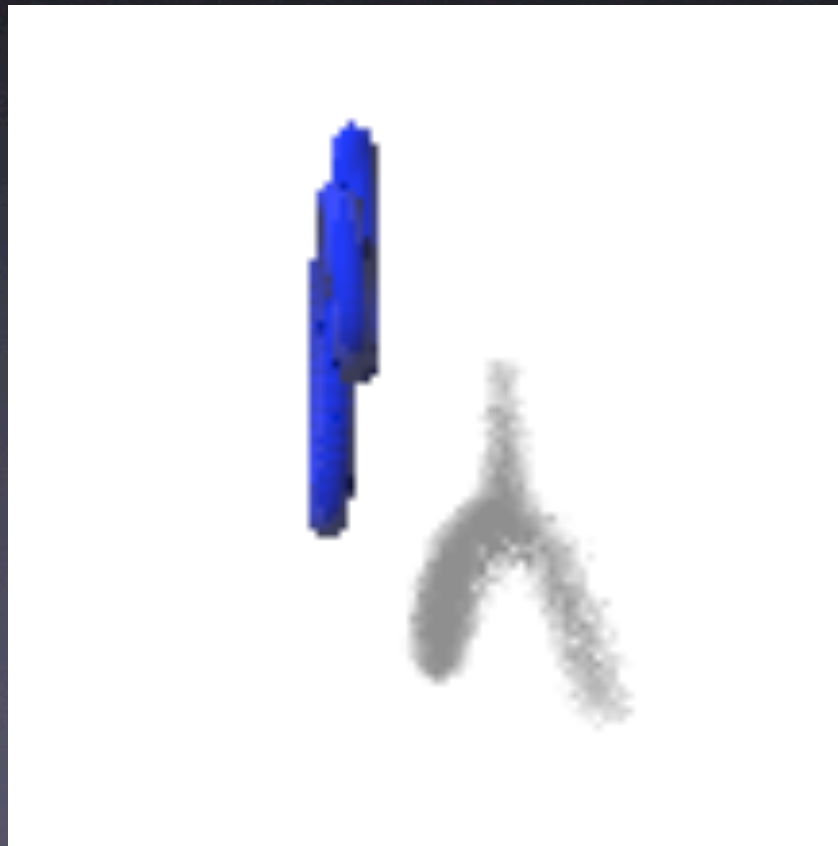
# David Gross

Organized by  
Lars Brink  
Ulf Danielsson  
Ulf Lindström  
Joseph Minahan  
Antti Niemi  
Maxim Zabzine



# STRING THEORY

Where do we stand?



# 1. WHAT IS STRING THEORY?

2. HOW MANY STRING THEORIES ARE THERE?

3. STRING TECHNOLOGY?

4. WHAT IS THE NATURE OF STRING PERTURBATION THEORY?

5. STRING PHENOMENOLOGY?

6. WHAT IS THE NATURE OF HIGH ENERGY PHYSICS?

7. WHAT PICKS THE CORRECT VACUUM?

8. IS THERE A MEASURABLE, QUALITATIVE,  
DISTINCTIVE PREDICTION OF STRING THEORY?

9. WHAT IS SPACETIME MADE OF?

10. WHAT ARE THE RULES OF QUANTUM COSMOLOGY?

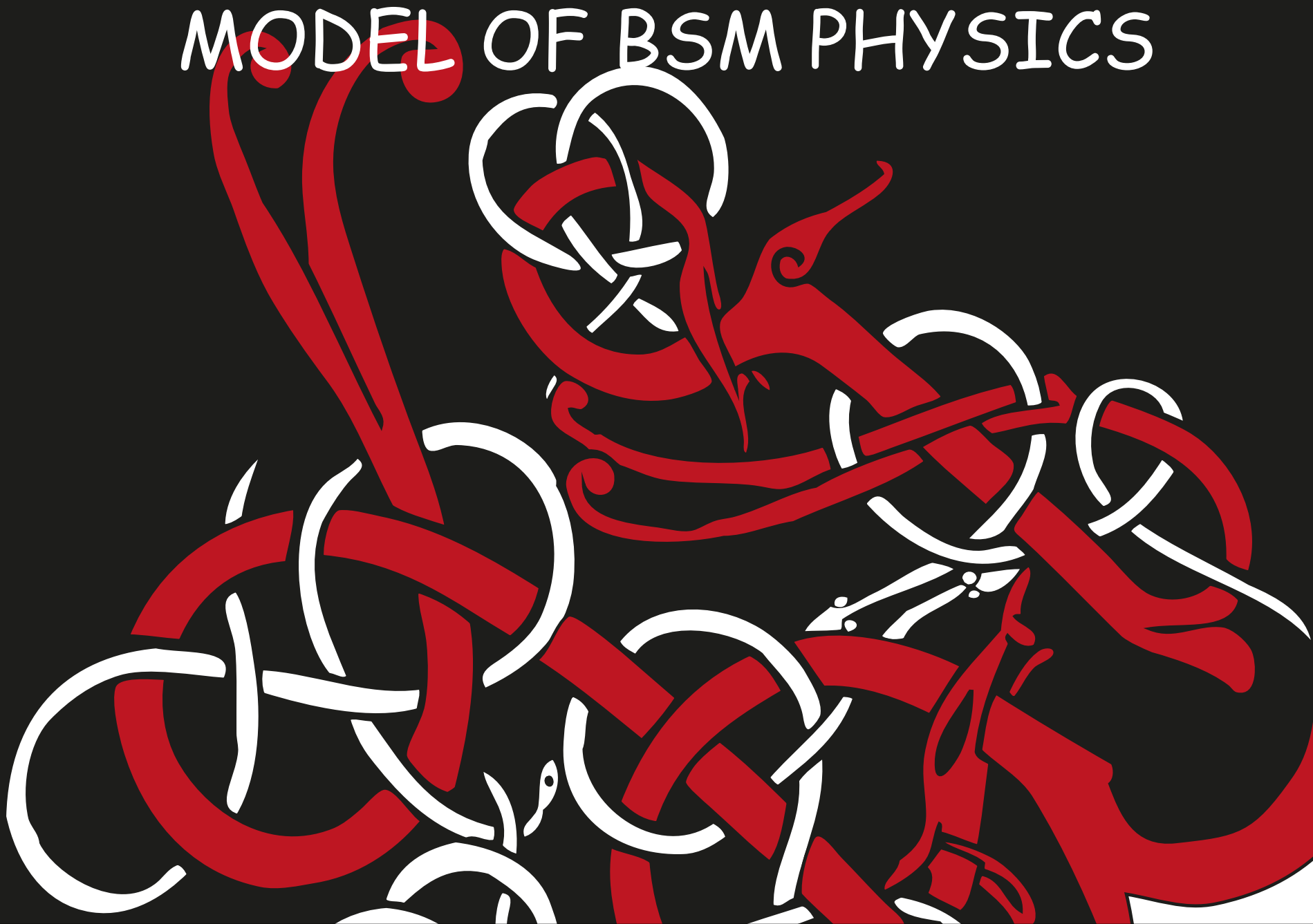
11. WHAT WILL WE LEARN FROM THE LHC ?

We are still awaiting  
surprising  
results from the LHC

SO FAR: THE STANDARD  
MODEL IS PERFECT

SHOULD WE WORRY?

WE STILL LACK A PREDICTIVE  
MODEL OF BSM PHYSICS



# AdS/CFT

INTEGRABILITY in 2D, 3D, 4D

Quantum critical points in 3,4 Dim.

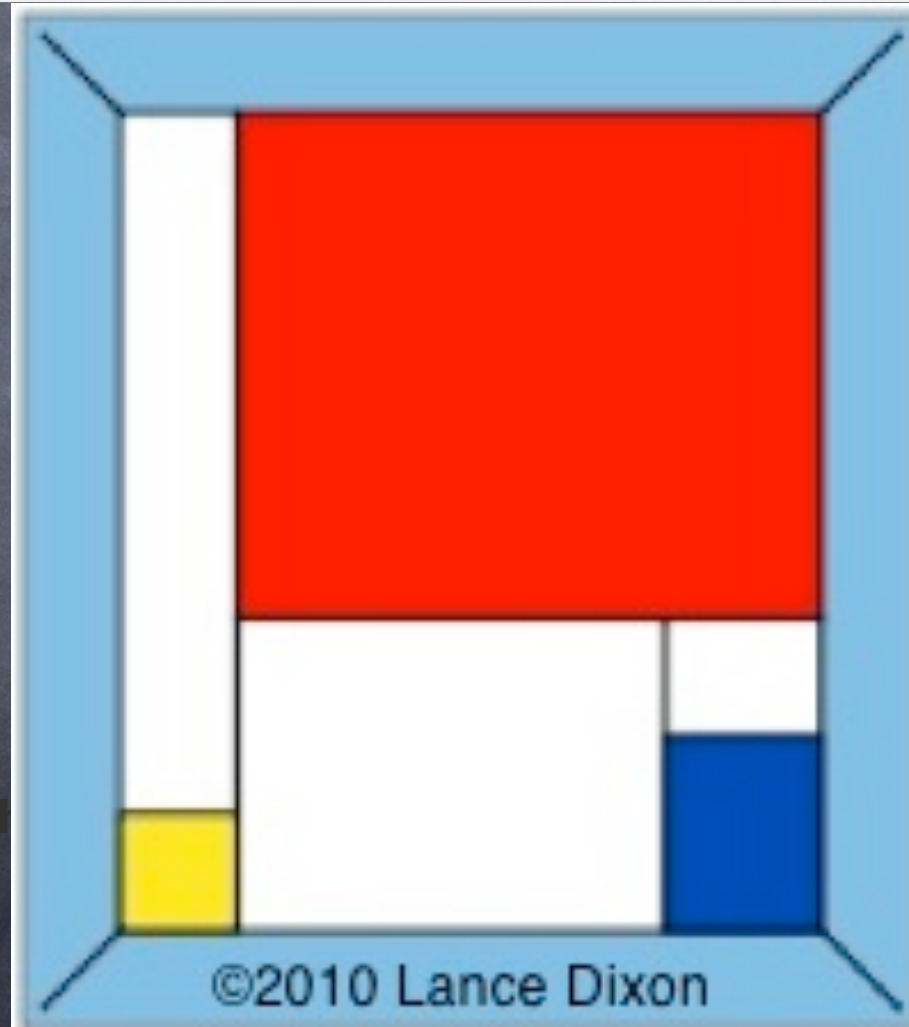
Superconductors, Quark-Gluon Liquid

NEW HOLOGRAPHIC MODELS--

Higher Spin Gravity

N=4 PLANAR SUSY-YM

# The Harmony of Scattering Amplitudes



What do we learn from  
Planar,  $N=4$  SUSY-YM ?  
Twistors, Polytopes in the  
Grassmanian .....

Is there more than just  
integrability?

# Eric Verlinde

GRAVITY AND SPACE EMERGE  
BY INTEGRATING OUT FAST  
DEGREES OF FREEDOM

AS IN M(atrix)-Theory or AdS/CFT

Heat bath of fundamental  
degrees(?) of freedom yields

Dark Energy & Matter

# De Sitter Space

Perturbation theory instabilities

What are the observables?

Holography?

Future boundary conditions

.....

Questions, Questions, Questions.

THE MOST IMPORTANT  
PRODUCT OF KNOWLEDGE  
IS IGNORANCE.

IT WOULD BE NICE TO HAVE  
SOME ANSWERS.

Har en stor  
KONFERENS