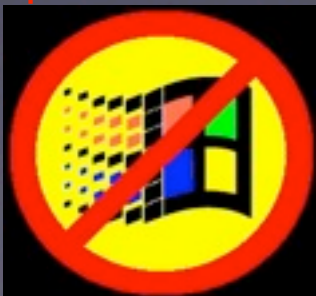



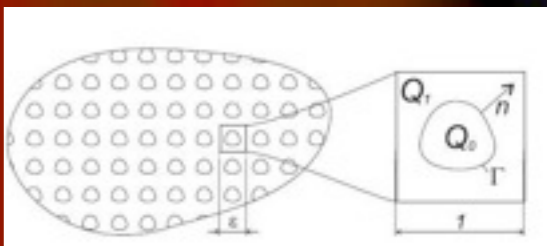
Develop your Presentation Skills

Andrew Liddle
September 2012

Microsoft-free
presentation



You're On!
Fundamentals of
Public Speaking

$$-\operatorname{div}(a_\varepsilon(x) \nabla u^\varepsilon) = \lambda^\varepsilon \rho_\varepsilon(x) u^\varepsilon,$$

$$\|\lambda^\varepsilon - \lambda_0 - \varepsilon \lambda_1\| \leq C \varepsilon^5$$

$$\|\tilde{u}_\varepsilon - U(x, x/\varepsilon)\|_\Omega \leq C \varepsilon$$

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- Technical problems (projector/laptop)

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- Lack of contextual introduction
- Too technical for audience
- Too much information crammed into each slide, especially equations

Execution

- Excessive use of animations
- Poor choice of colours
- Invisible/illegible diagrams
- Monotonous slide style
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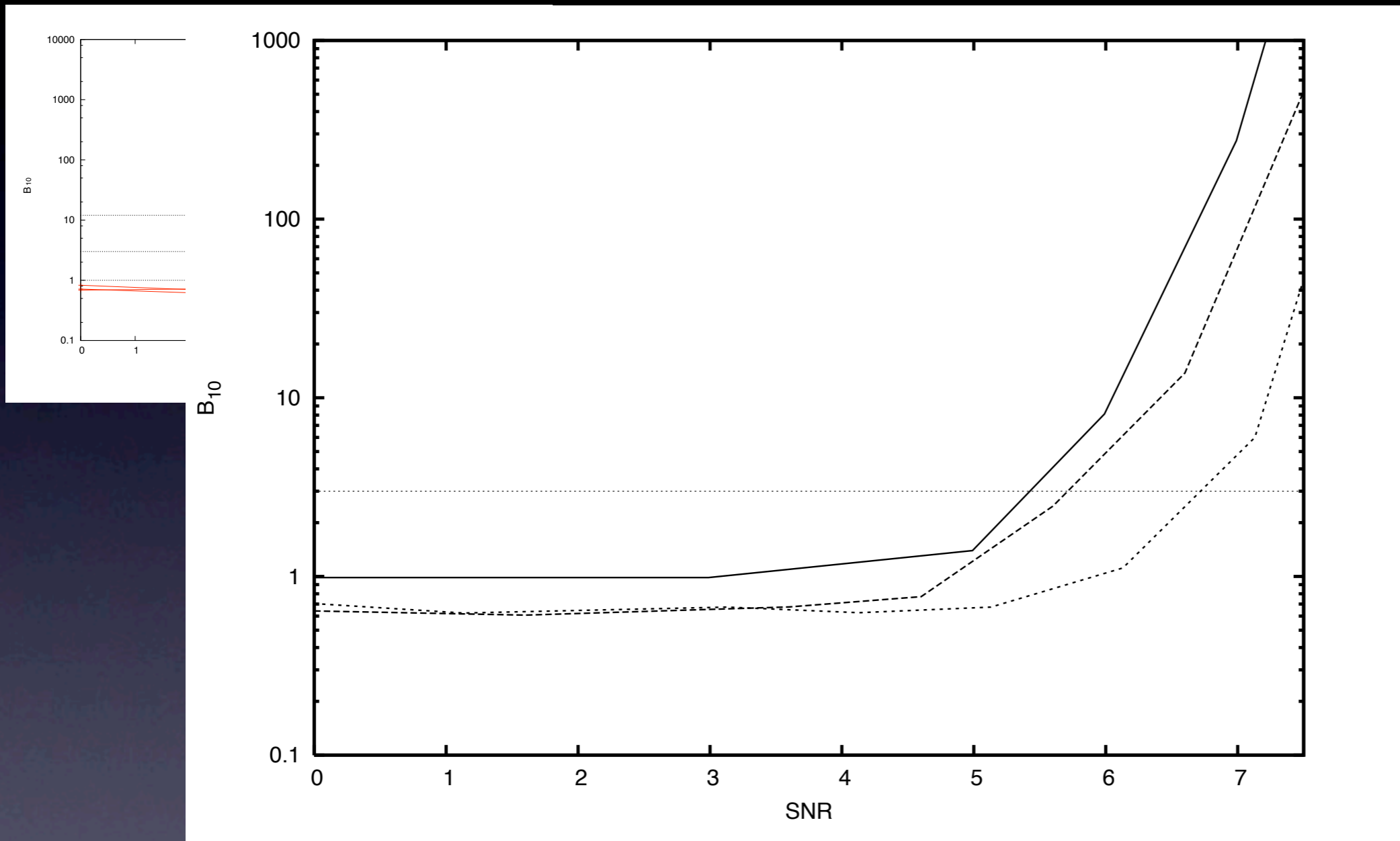
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Animation overkill

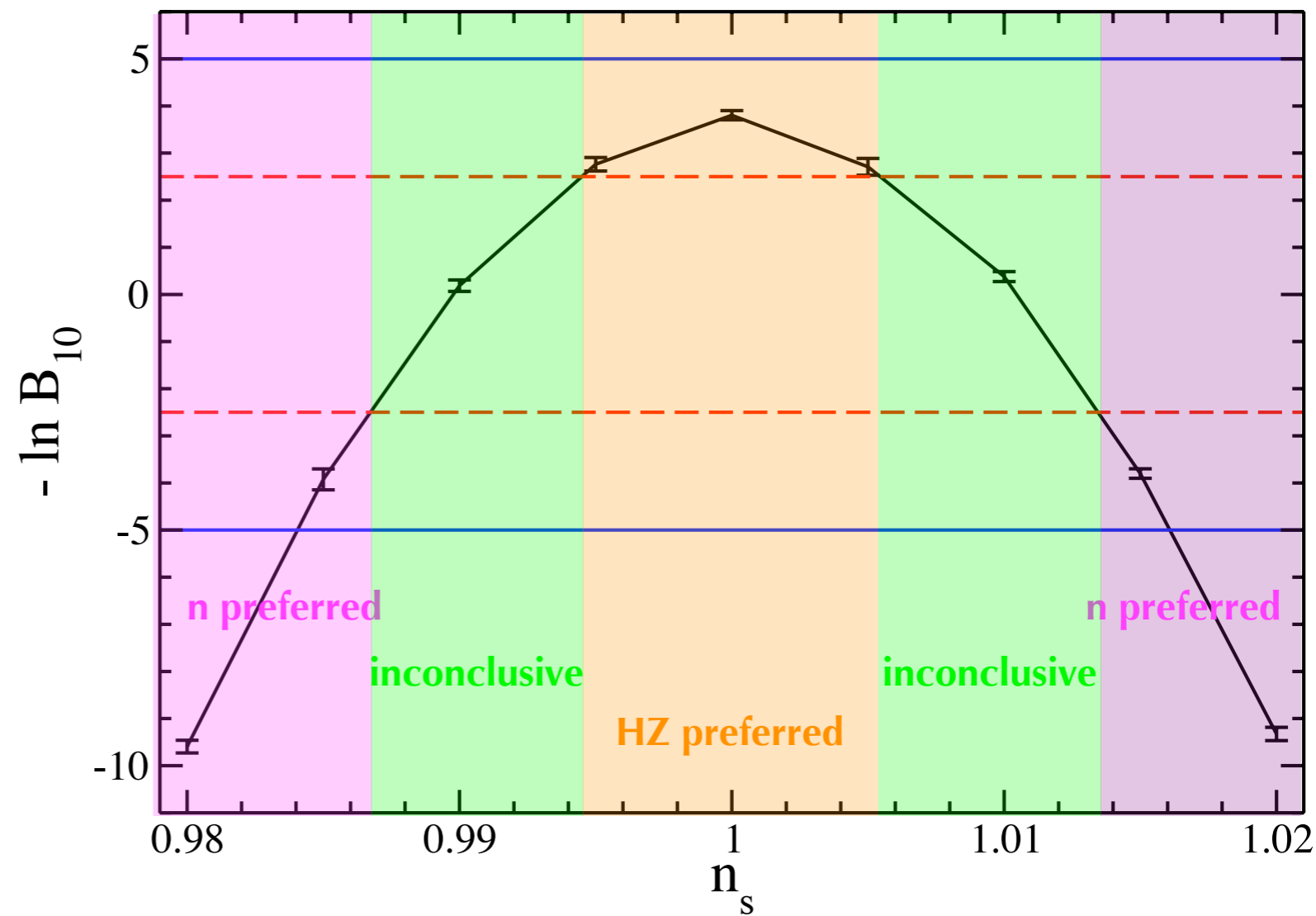
With modern software it is

Please!

Diagrams



Diagrams



Colour schemes

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Colour schemes

suslect09

New Play View Themes Masters Text Box Shapes Table Charts Comment Smart Builds Mask Alpha Group Ungroup Front Back Inspector Media Colors Fonts Format Bar

1 Deciphering the Universe
A colorful, abstract visualization of the universe's structure, showing a central point with radiating lines and a grid of colored dots.

2 The cosmological quest
Modern cosmology is a global and collective effort. Our aim: To put in place a precise description of our Universe that can stand the test of time, and perhaps outline us all. This ambition is possible because:
• The superb quality of new observational data, from many sources.
• The development of theoretical models containing enough ingredients to explain observed phenomena.
• The power of modern high-performance computers for data acquisition and analysis, and for determining theoretical predictions from models.

3 What is a model?
A model is a physical/mathematical construct intended to represent some aspects of the real world. Models usually come in two parts.
Clever Ideas: e.g. theory of gravity, hot big bang cosmology, quantum mechanics.
Parameters: e.g. strength of gravity, expansion rate of Universe, speed of light.
If a model is to be much good, it should be fit consistent with observations, and be predictive.

4 What cosmological model?
These are the principles and physical laws underpinning the Universe.
• **Hot big bang cosmology:** Describes the global properties of the Universe, its expansion, and its material content.
• **Structure formation by gravitational instability:** Describes the growth of structure from initially-small irregularities. Gravity for the initial collapse, lots of other physics in the details.
• **Inflationary cosmology:** The leading candidate theory for explaining where those initial irregularities came from: quantum fluctuations during rapid expansion of the young Universe.

5 Everything I know about how or why the Big Bang happened.
A large empty white box with a purple border.

6 The Hot Big Bang
It has been known for almost 80 years that the Universe is expanding. Einstein's theory of general relativity is used to explain this. Our challenge is to figure out the material constituents of the Universe, currently believed to have four parts:
• Baryons (protons, neutrons and electrons)
• Radiation (photons)
• Neutrinos (very weakly interacting particles)
• Dark matter
• Dark energy (eg cosmological constant)

7 Structure formation
The Universe evolves, and will continue to do so. Galaxies form and are presently assembling into galaxy clusters and superclusters. Gravity is the main player: initially overdense regions exert greater gravitational attraction on their neighbouring regions and accumulate material.
The details of the gravitational instability mechanism depend on the properties of the Universe, such as its material composition. Study structure formation, and you learn about the Universe.

8 Inflationary cosmology
What created the seeds that gravitational instability amplified? According to the leading paradigm, **cosmological inflation**, the seeds were created by quantum uncertainty in the very young Universe. By studying the seeds from which galaxies grew, we learn about processes in the very young Universe. These processes determine how the Universe looks today.

9 The era of precision cosmology
Precision observations
Precision theory

10 Wilkinson Microwave Anisotropy Probe (WMAP) Simulation
A colorful, abstract visualization of the universe's structure, showing a central point with radiating lines and a grid of colored dots.

11 The cosmic microwave background
This is relic radiation left over from the hot early stages of the Big Bang. It tells us about physical conditions in the young Universe. Discovery of 'seed' irregularities in the CMB led to the award of the 2006 Nobel Prize to John Mather and George Smoot.

12 What do we do at Sussex?
A large empty white box with a yellow border.

13 Sussex specialities
• **Physics of the early Universe:** We aim to understand how physical processes taking place in the very young Universe affect its properties today.
• **Applications of high-performance computing to cosmological problems:** We use some of the most powerful available computers to understand our models.
• **New statistical approaches to cosmology:** We aim to develop new methods to extract the best possible information from observational data.
• **Large cosmological surveys:** We are involved in large ground- and space-based observational programmes.

14 Key projects
• **Herschel Satellite:** Seb Oliver co-leads HERMES (the Herschel Multi-Tiered Extragalactic Survey), the biggest single observational programme on the European Space Agency's upcoming Herschel satellite.

15 Herschel Satellite, artist's impression, courtesy European Space Agency
A detailed illustration of the Herschel Space Observatory satellite, showing its complex structure and instruments.

16 Key projects
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• **Planck Satellite:** Launching with Herschel, Planck will measure the cosmic microwave background in unprecedented detail.
• **Dark Energy Survey:** We recently joined the international DES consortium, which seeks to uncover the nature of dark energy in the Universe.

17 Herschel/Planck satellite launch, scheduled May 6th something-th 2009
A photograph of the Herschel and Planck satellites being launched from the Ariane 5 rocket.

18 Herschel satellite launch, scheduled May something-th 2009
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19 Herschel/Planck satellite launch, scheduled May something-th 2009
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20 Planck will make exquisite all-sky maps of the cosmic microwave background, relic radiation left over from the Universe's early stages. This will enable precision measurements of the physical properties of our Universe.

21 The cosmic fingerprint
Questions:
• How fast is the Universe expanding?
• What are the amounts of the different kinds of materials in it? **Atoms** **radiation** **dark matter** **dark energy**
• How old is the Universe?
• What form do the initial seed irregularities take?
• ...
Each of the different possible Universes predicts a distinctive pattern in the structures seen in the cosmic microwave background. Measure them, and we find out which Universe is ours!

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Slides

- 1
- 2
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