Strategies for making effective oral presentations

Efrain Segarra

LTPhD Series

Dec 5, 2023

No matter how well a talk goes, there are always things to improve

My best talk

My next one

Worse

Better

What's the goal of a talk?

What's the goal of a talk?

It is not to:
- present your work
- convey information
- survive

What's the goal of a talk?

It is not to:
- present your work
- convey information
- survive

The goal is to **convince the audience to act different**
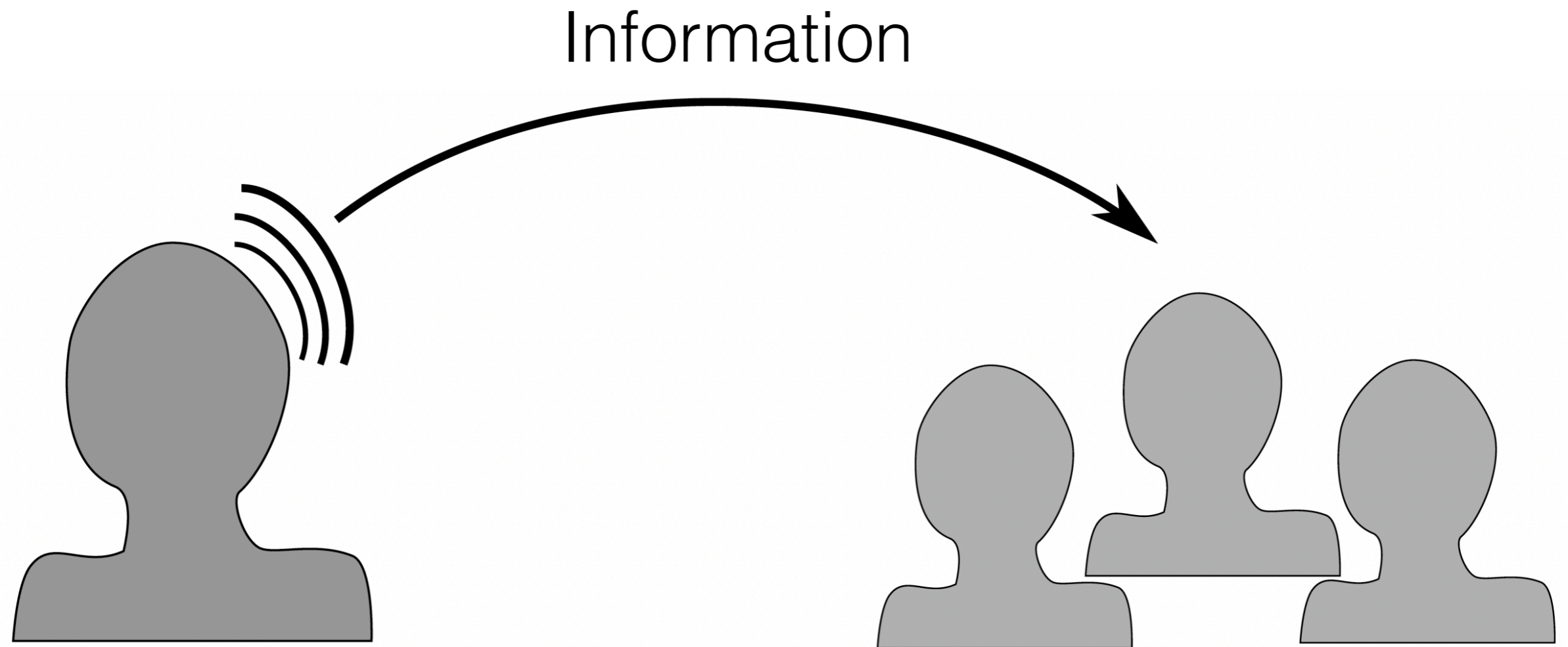
What's the goal of a talk?

It is not to:
- present your work
- convey information
- survive

The goal is to **convince the audience to act different**
- hire me
- approve my experiment
- embrace my hypothesis

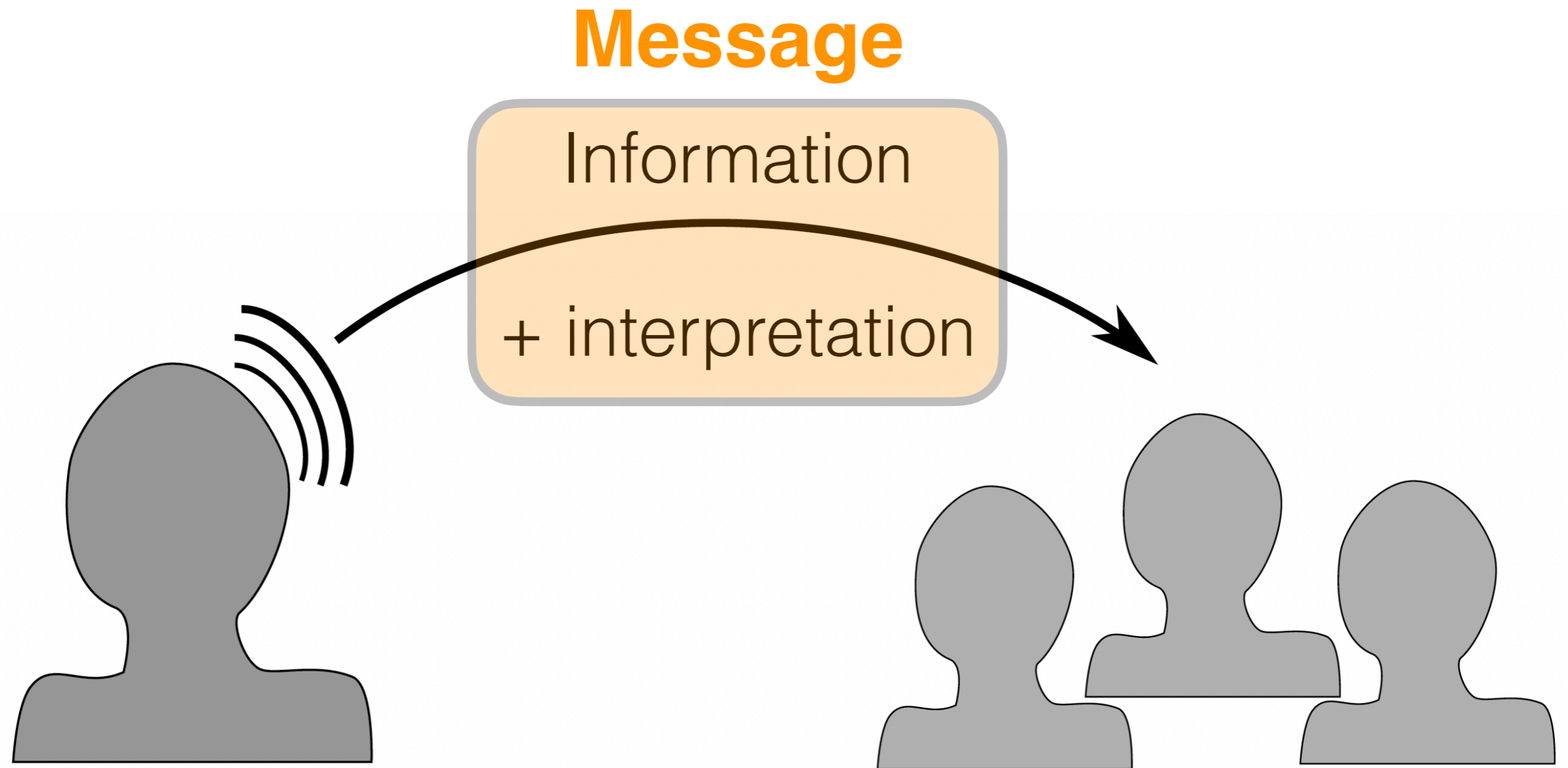# Convincing an audience depends on them **comprehending** messages

Information

Convincing an audience depends on them **comprehending** messages

Information

+ interpretation

Convincing an audience depends on them **comprehending** messages

Message

Information

+ interpretation

9

Convincing an audience depends on them **comprehending** messages

Message

Information

+ interpretation
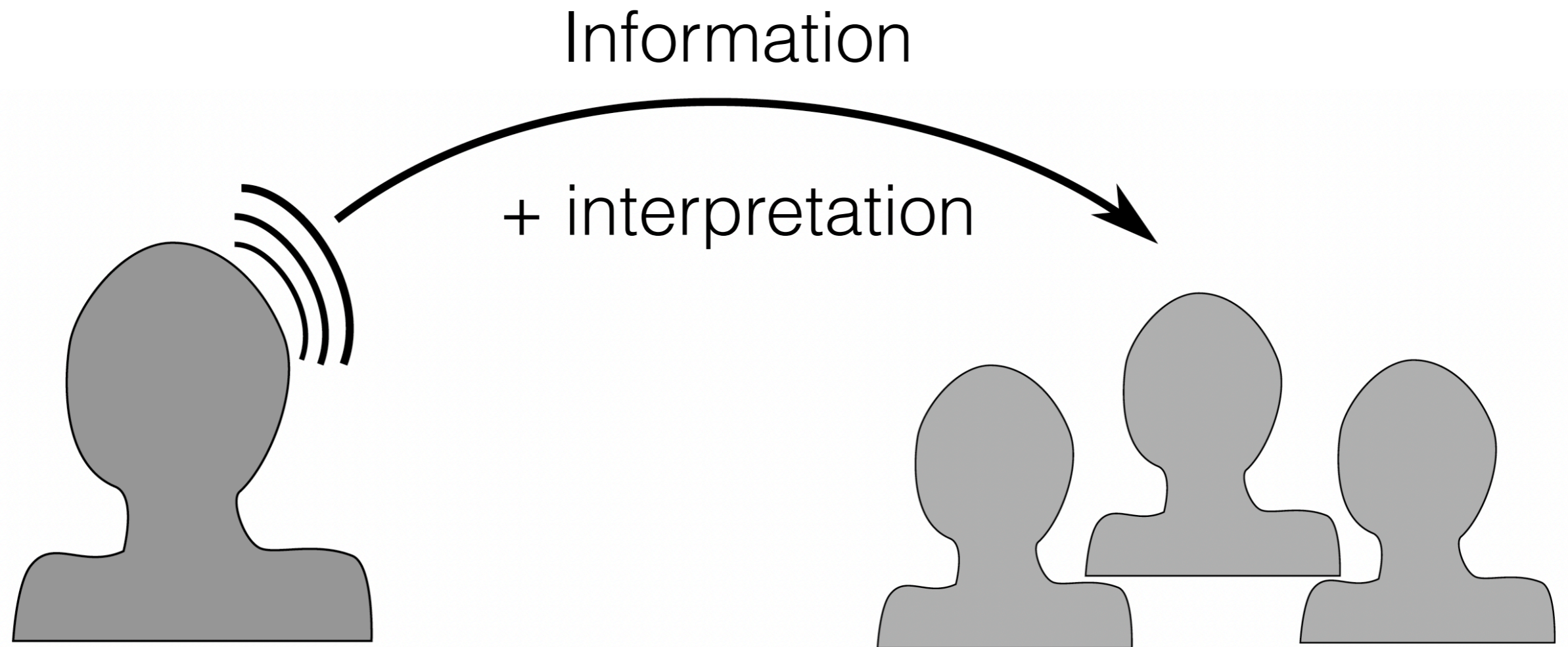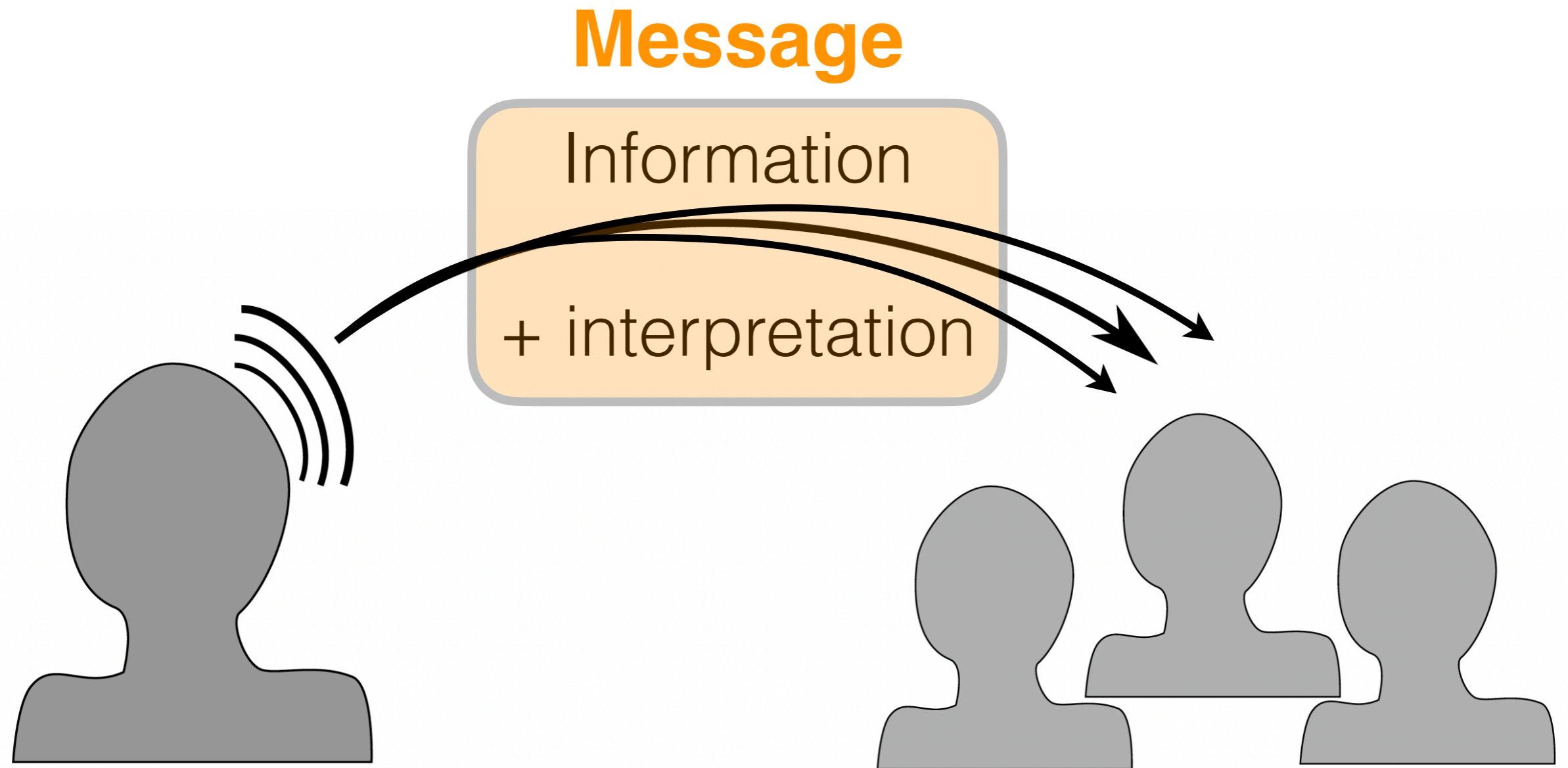
Optimization under constraints

Maximize number of messages **comprehended by the audience**

Constrains:
- time
- audience bandwidth

Three areas that can lead to big improvements

- **Structure**: think messages not slides

- **Visuals**: support your message, don't distract

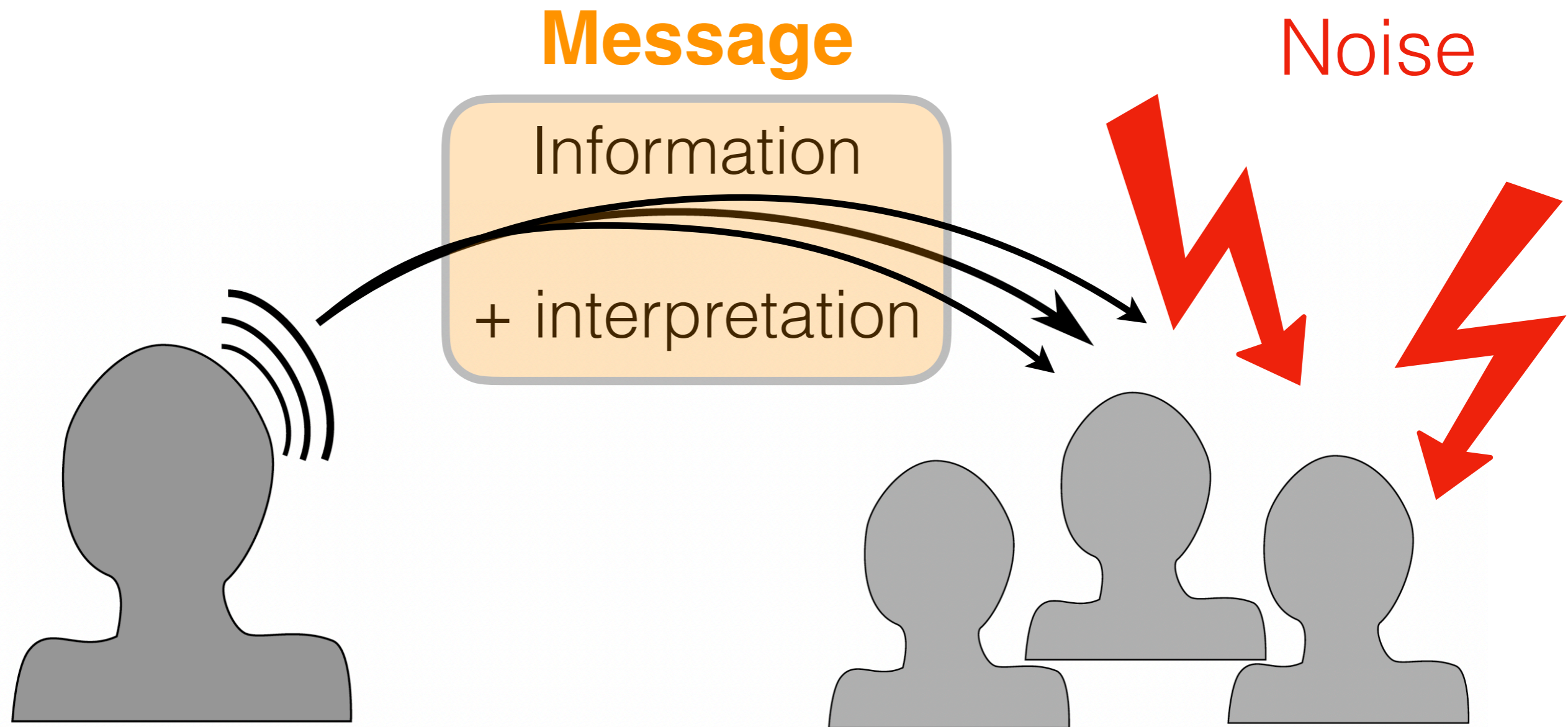- **Performance**: the message won't speak for itself

Three areas that can lead to big improvements

- **Structure**: think messages not slides

- **Visuals**: support your message, don't distract

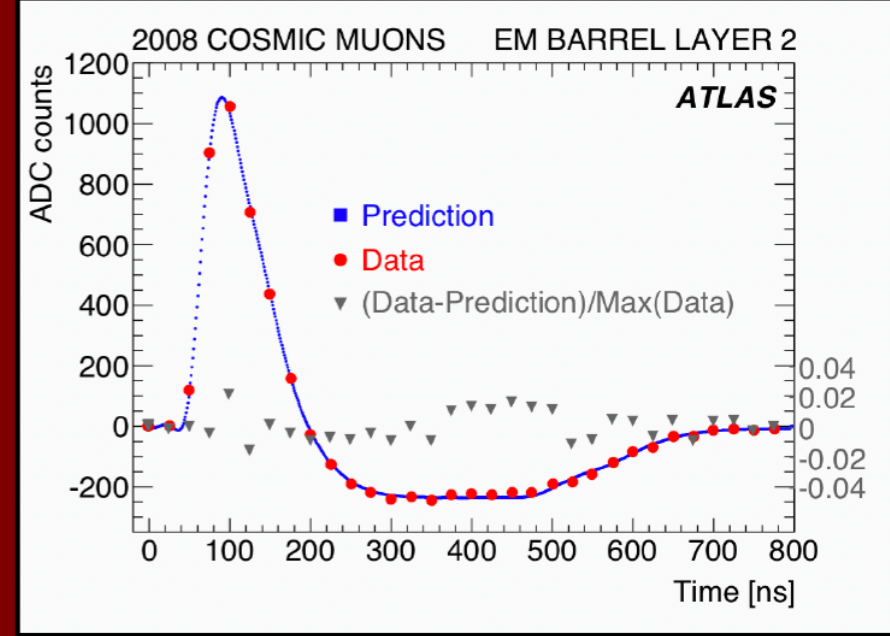- **Performance**: the message won't speak for itself

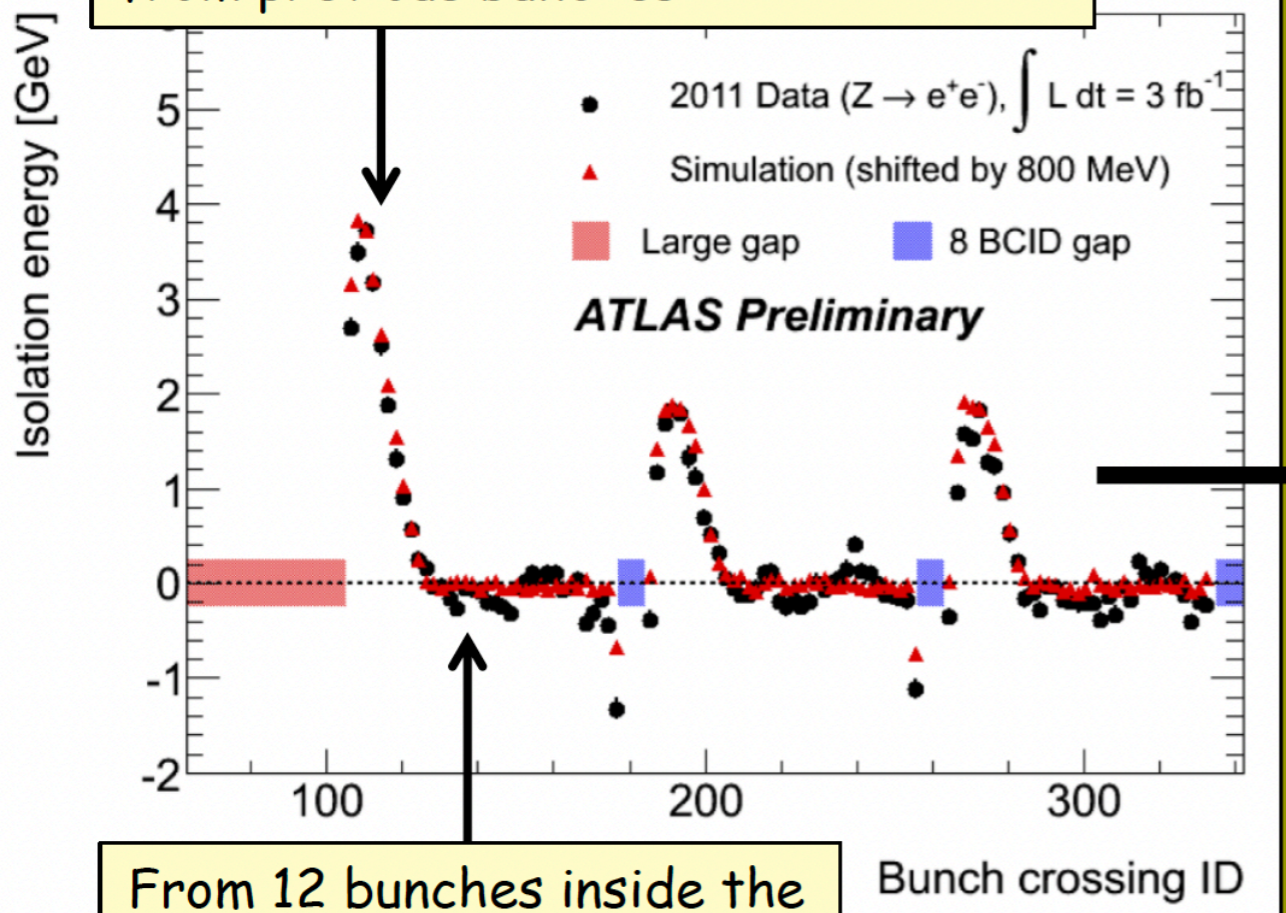# Your messages are competing against a lot of noise

Message

Noise

Information

+ interpretation

Photon isolation requirement: E_T < 4 GeV inside cone ΔR < 0.4 around γ direction. Pile-up contribution subtracted using an "ambient energy density" event-by-event

If subtraction is not perfect, residual dependence of the isolation energy on the bunch position in the train observed, due to impact of out-of-time pile-up from neighbouring bunches convolved with EM calorimeter pulse shape.
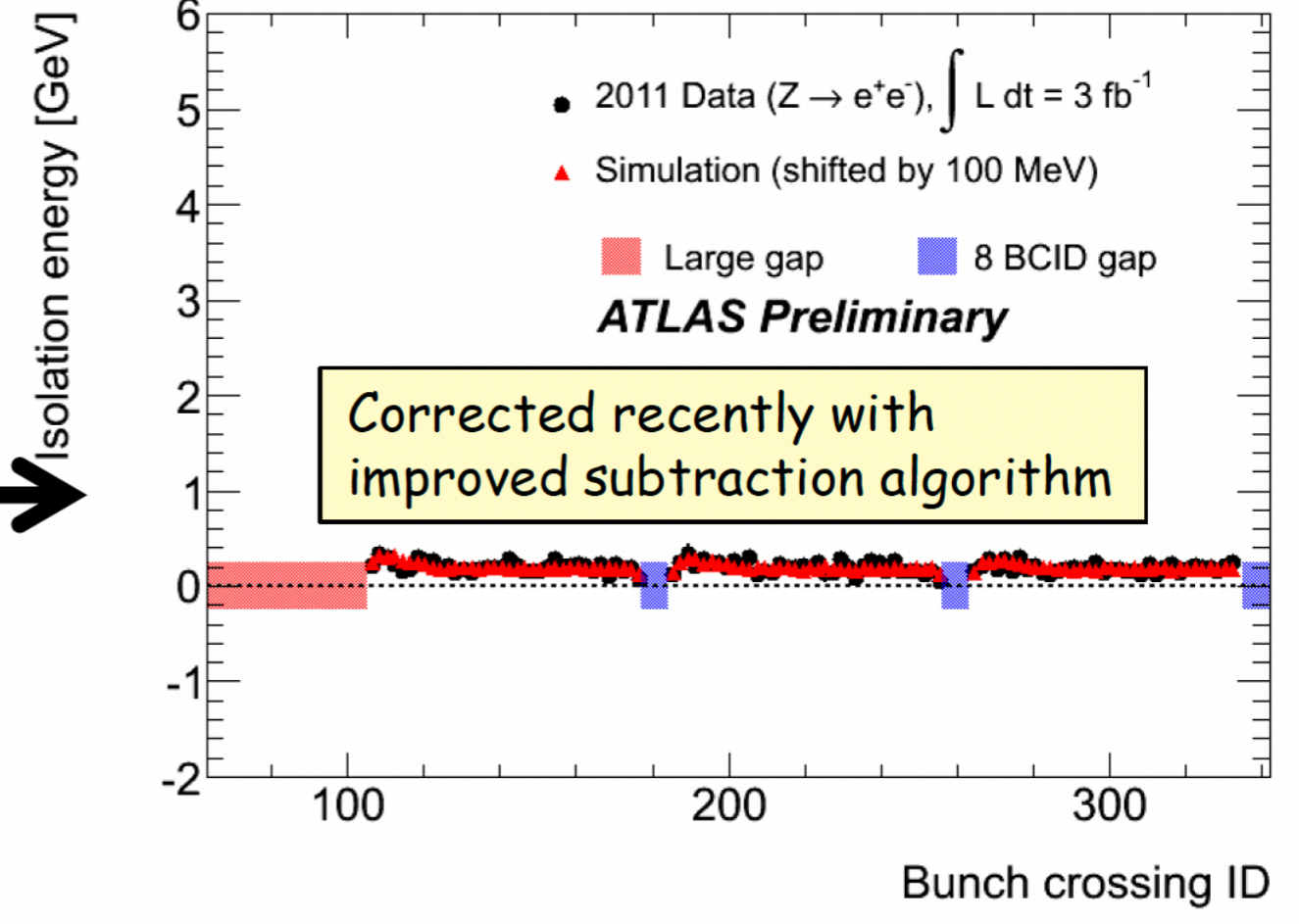
Calorimeter bipolar pulse shape: average pile-up is zero over ~ 600 ns (~12 bunches)

2008 COSMIC MUONS   EM BARREL LAYER 2
ATLAS
■ Prediction
● Data
▼ (Data-Prediction)/Max(Data)

Beginning of the train: no cancellation from previous bunches

2011 Data ($Z \rightarrow e^+e^-$), $\int L\,dt$ = 3 fb^{-1}
Simulation (shifted by 800 MeV)
Large gap   8 BCID gap
ATLAS Preliminary

From 12 bunches inside the train: full cancellation

2011 Data ($Z \rightarrow e^+e^-$), $\int L\,dt$ = 3 fb^{-1}
Simulation (shifted by 100 MeV)
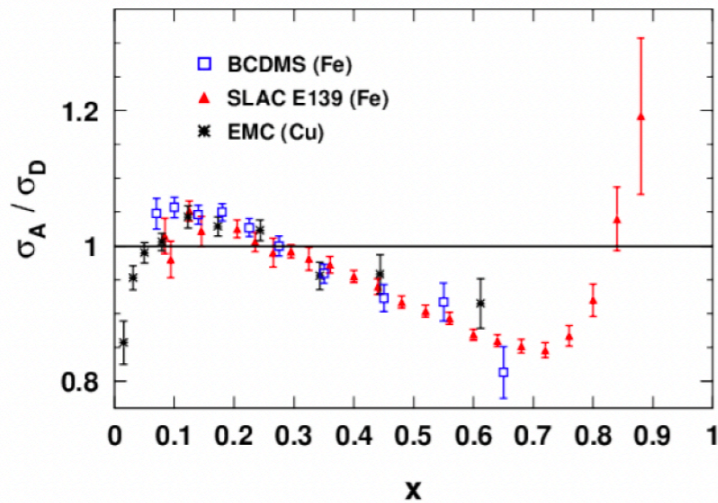Large gap   8 BCID gap
ATLAS Preliminary

Corrected recently with improved subtraction algorithm

Effect well described by (detailed !) ATLAS simulation

Flavor-Dependent EMC Effect

➢ **What is the EMC Effect?**

❖ The ratio of inclusive DIS cross-section between a nucleus-A to the deuteron drops linearly in 0.3<x<0.7
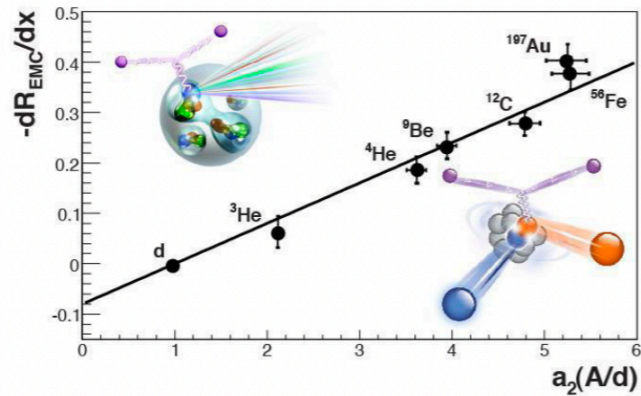

❖ Discovered in 1980s; Yet, no clear explanation of its origin
  New experimental techniques are strongly needed

❖ Correlations of A-dependence in EMC vs SRC:

  ○ Only modify nucleons in SRC pairs?
  ○ High virtuality?

  L. Weinstein et al, PRL 106, 052301 (2011)
  J. Arrington et al., PRC 86, 065204 (2012)
  O. Hen et al, PRC 85, 047301 (2012)


❖ More questions related to the EMC effect:
  ▪ Isospin dependence for the same A?
  ▪ Flavor-dependence?
  ▪ EMC effects in sea-quarks?
  ▪ Connection to lower-x phenomena (integrated momentum has to be conversed)?

  Need new observables beyond inclusive DIS

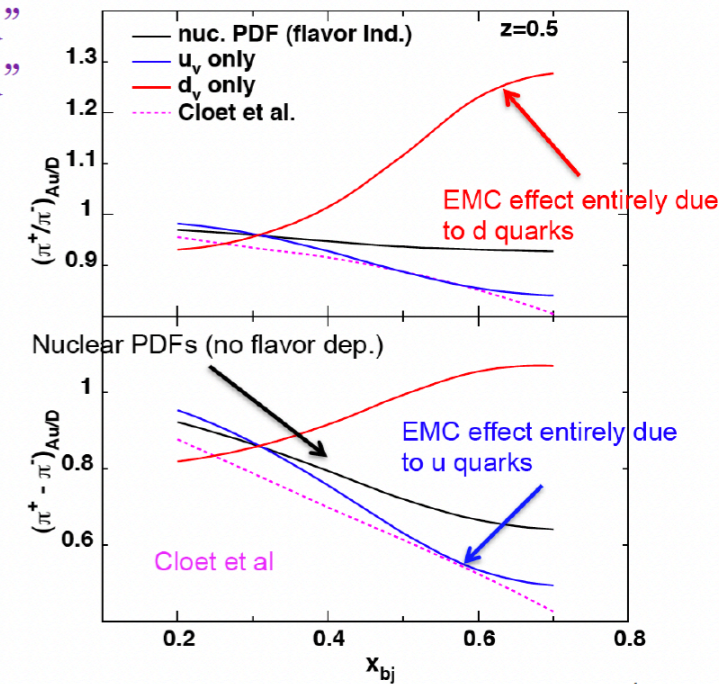 **Need wide kinematic ranges (Jlab + EIC)**

❖ Theoretical calculation of Gold indicates a flavor-dependent EMC effect

  In $Z \neq N$, different medium effect on u- and d- quark:

  ✓ If N>Z, u-quark is more "bound"
  ✓ If N<Z, d-quark is more "bound"
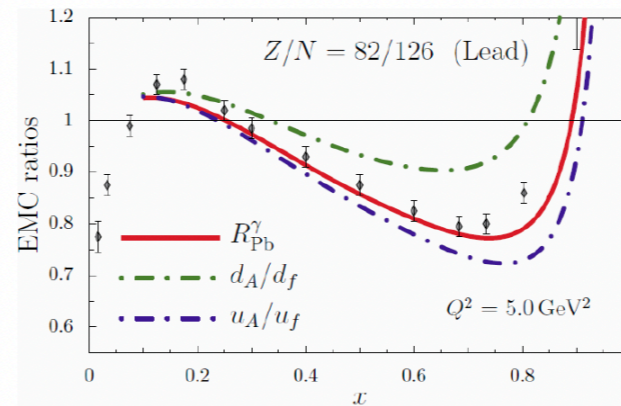
  I. Cloet, et al, PRL 109, 182301 (2012);
  PRL 102, 252301 (2009)]

16

On the next slide, say "done" when you have read every single word.

Helium cryostat: test results

■ **Component tests validated the thermo-fluid calculations/simulations**

T. Okamura *et al.,* IOP Conf. Ser.: MSE. **755**, 012141 (2020)

■ **Cyrostat performance demonstrated:**

- Efficient pre-cooling (4 K in 48 h)
- Low static heat load (< 0.7 W as the entire system)
- Lowest temperature reached: 1.23 K with ^{4}He ($\leftrightarrow$ 0.65 K for ^{3}He) by a 2000 m^3/h pump

■ **Characterized boiling properties of HEX1 prototypes:**
- Transition to film boiling occurs at a higher heat input for the vertical-fin prototype
- Problem of the cylindrical-fin model: dry out of the liquid causing the transition at low heat input
  $\Rightarrow$ Decided on the vertical-fin HEX1 design

■ **After the tests…**
- Helium cryostat transported to TRIUMF (2021)
- Infrastructure in preparation at TRIUMF (pumps, transfer line…)
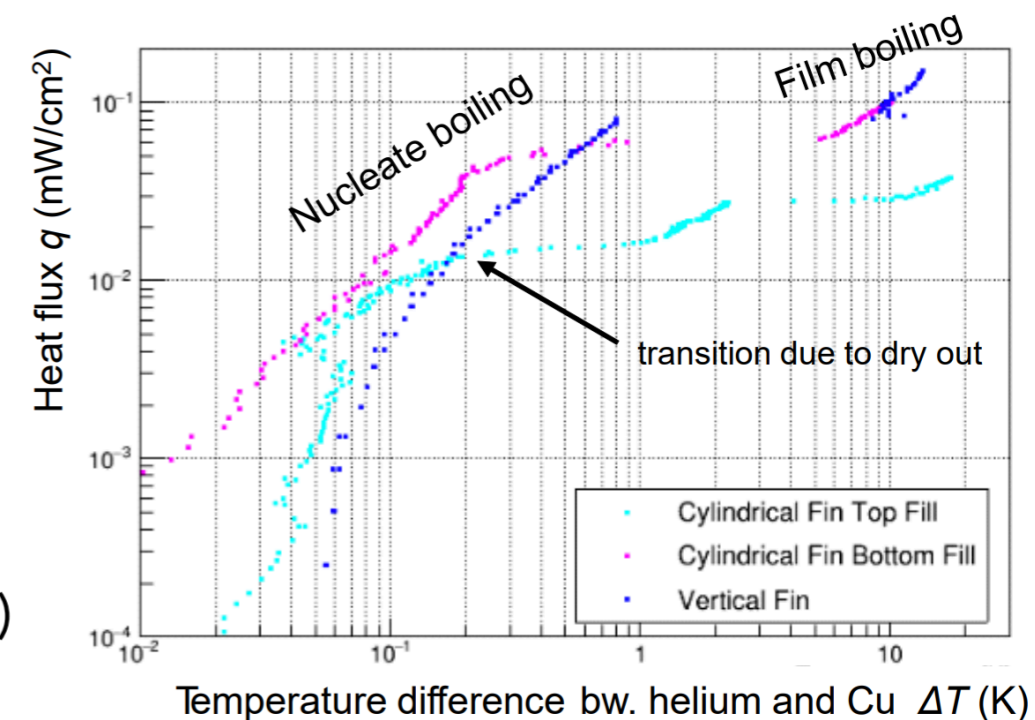
Improving a slide

Proton Form Factor Discrepancy
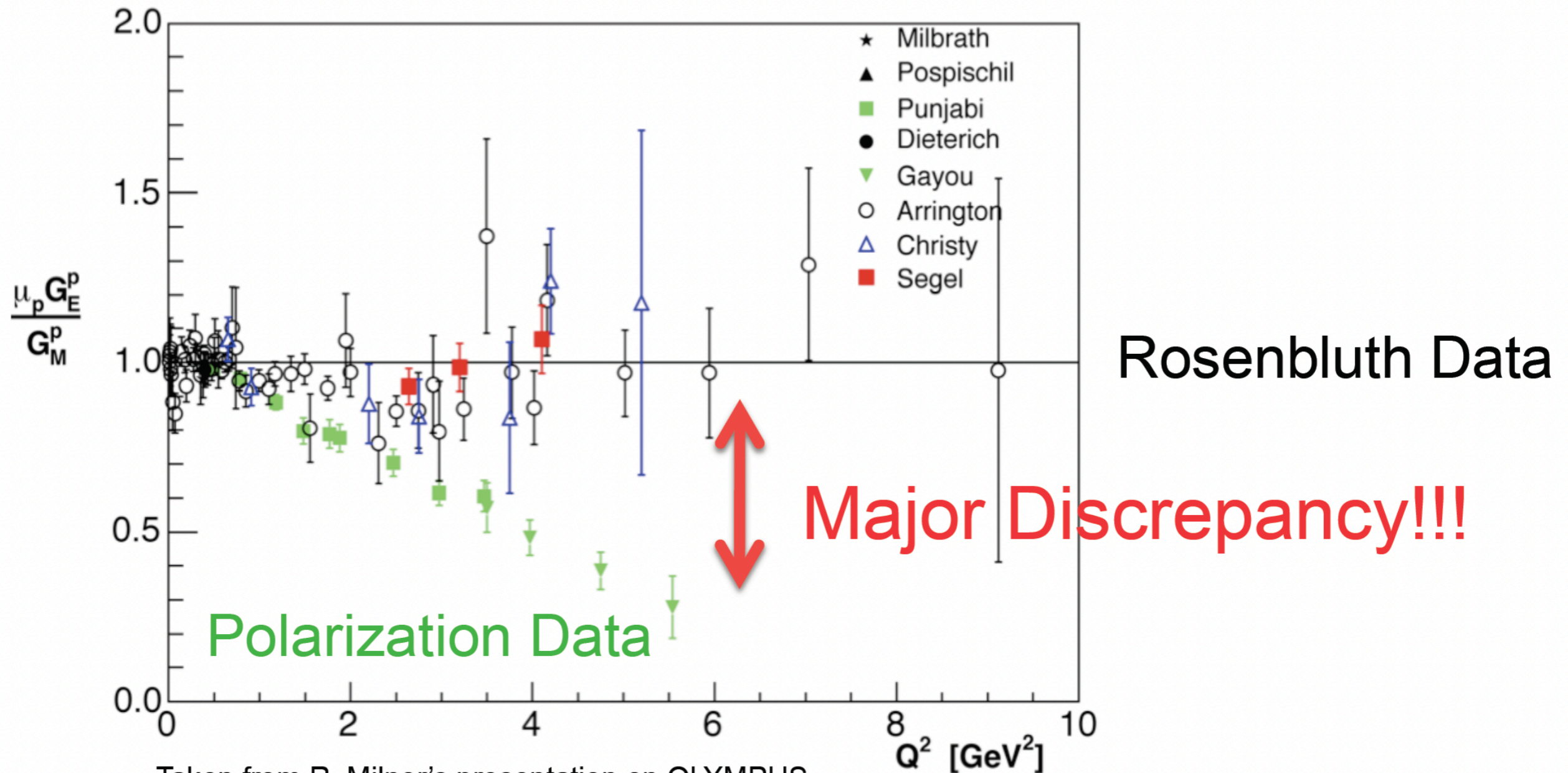
Proton Form Factor Ratio

Taken from R. Milner's presentation on OLYMPUS
July 17th, 2008 @ DESY, http://web.mit.edu/olympus

Rosenbluth and polarization measurements disagree on the proton's form factor ratio.

Proton Form Factor Ratio

Rosenbluth Data

Major Discrepancy!!!

Polarization Data

Taken from R. Milner's presentation on OLYMPUS
July 17th, 2008 @ DESY, http://web.mit.edu/olympus

Rosenbluth and polarization measurements disagree on the proton's form factor ratio.

Proton Form Factor Ratio

$\dfrac{\mu G_E}{G_M}$

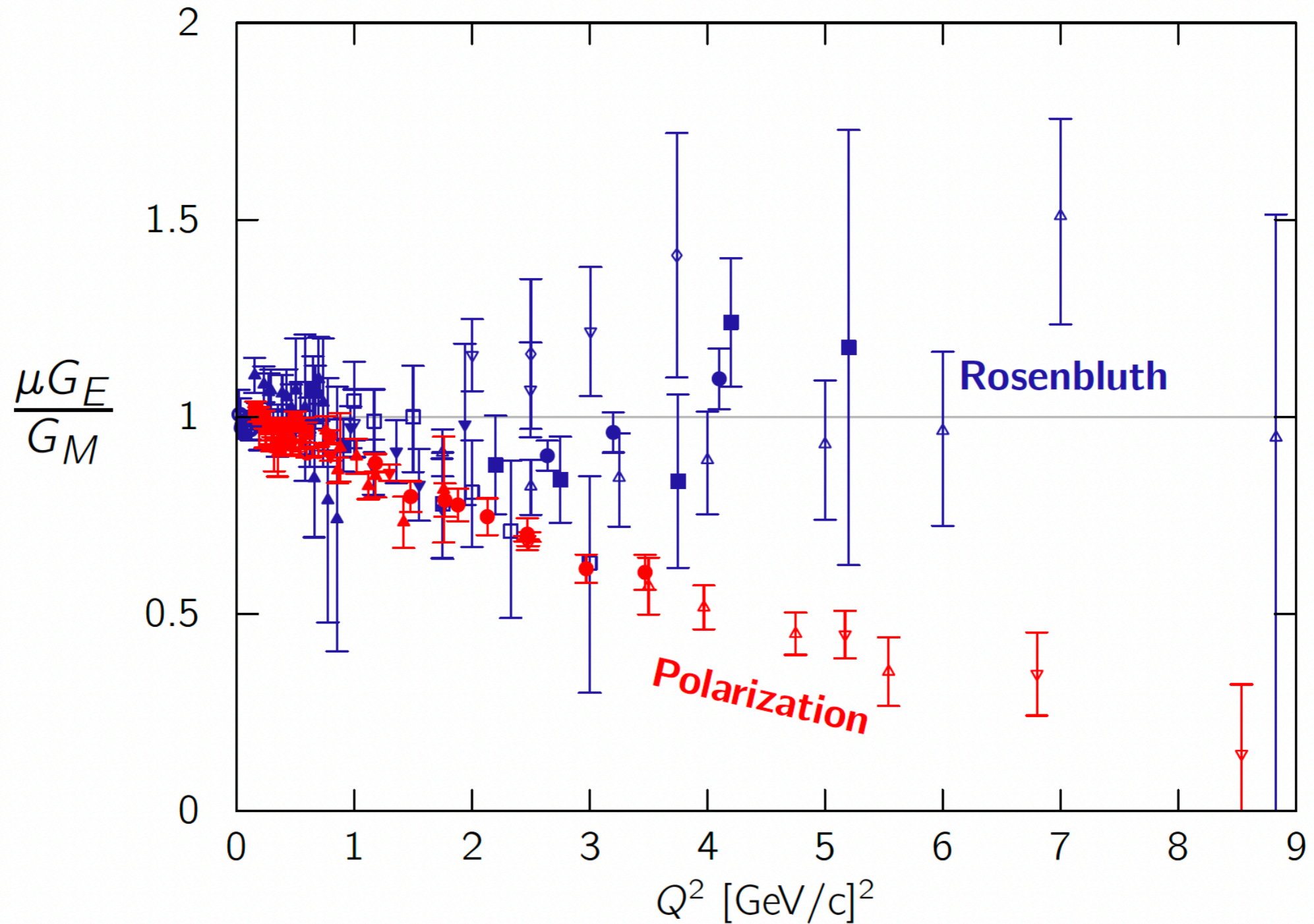Rosenbluth Data

Major Discrepancy!!!
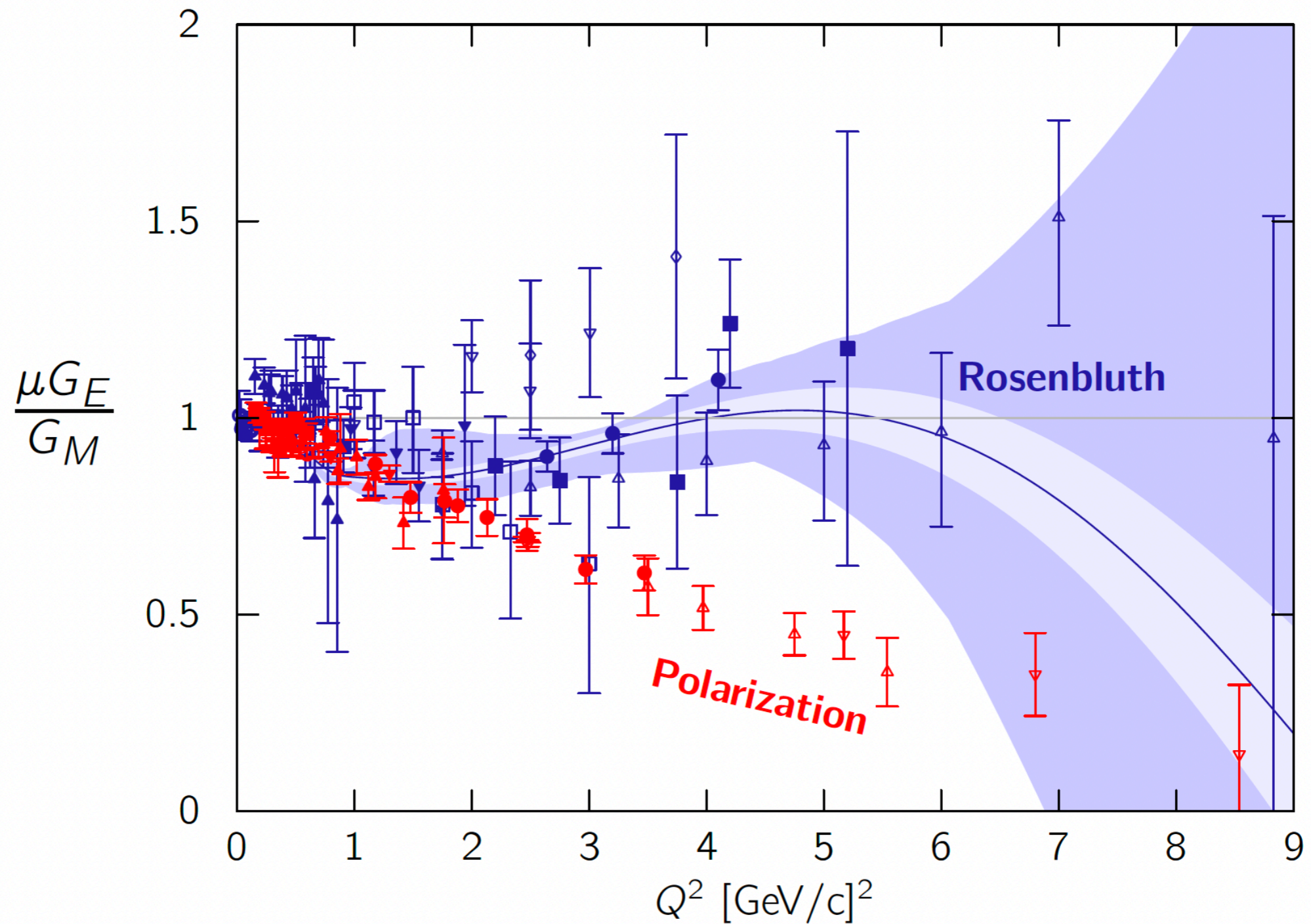
Polarization Data

Q^2 [GeV/c]^2
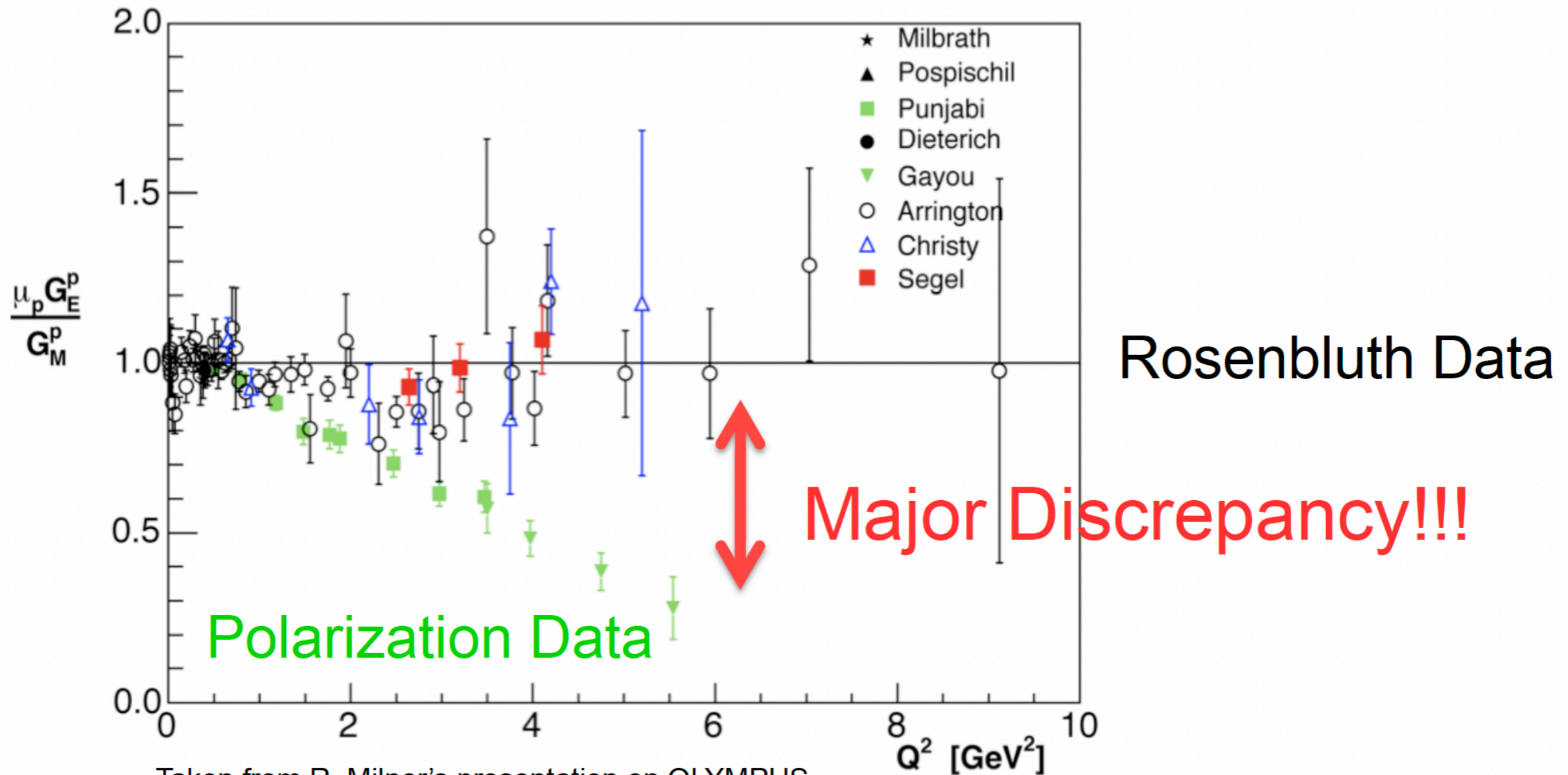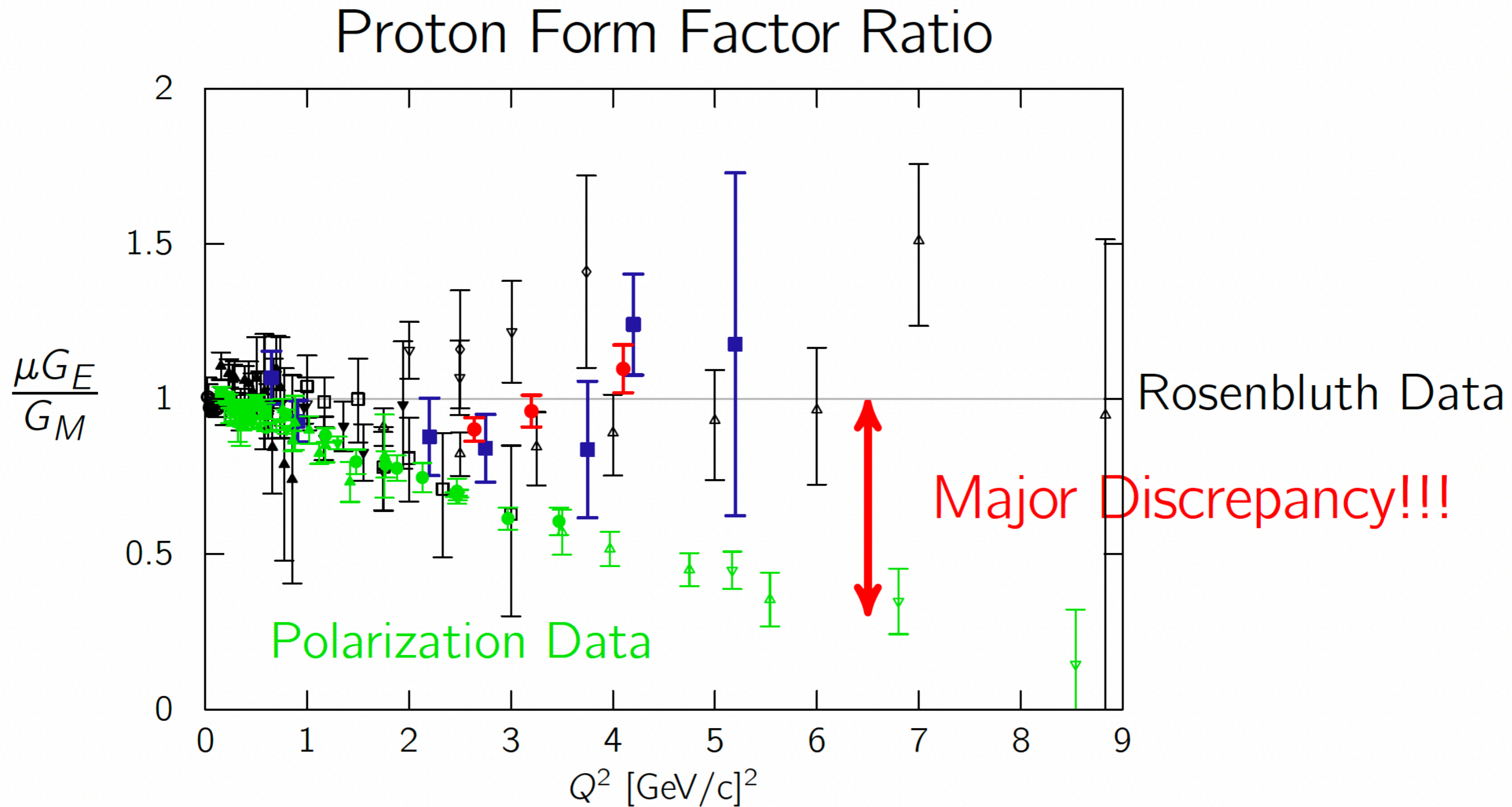
Rosenbluth and polarization measurements disagree on the proton's form factor ratio.

Rosenbluth and polarization measurements disagree on the proton's form factor ratio.

This is the template PSI recommends

PAUL SCHERRER INSTITUT

PSI

Musterseiten mit 2 Spalten und grauem Hintergrund

- Mustertext agnatet excepeliqui di aceruptat aut lat es dis aut expelecum eliam etus explatem.
  - unda non eaque nis dolupta epudam, odis acepraerum fugita venitat eat rem ullenistiat
    - aditis repre que nihic tem rae voluptatenis quod qui aceris restibus

- Mustertext agnatet excepeliqui di aceruptat aut lat es dis aut expelecum eliam etus explatem.
  - unda non eaque nis dolupta epudam, odis acepraerum fugita venitat eat rem ullenistiat
    - aditis repre que nihic tem rae voluptatenis quod qui aceris restibus

Seite 6

Figure quality will influence how professional you look
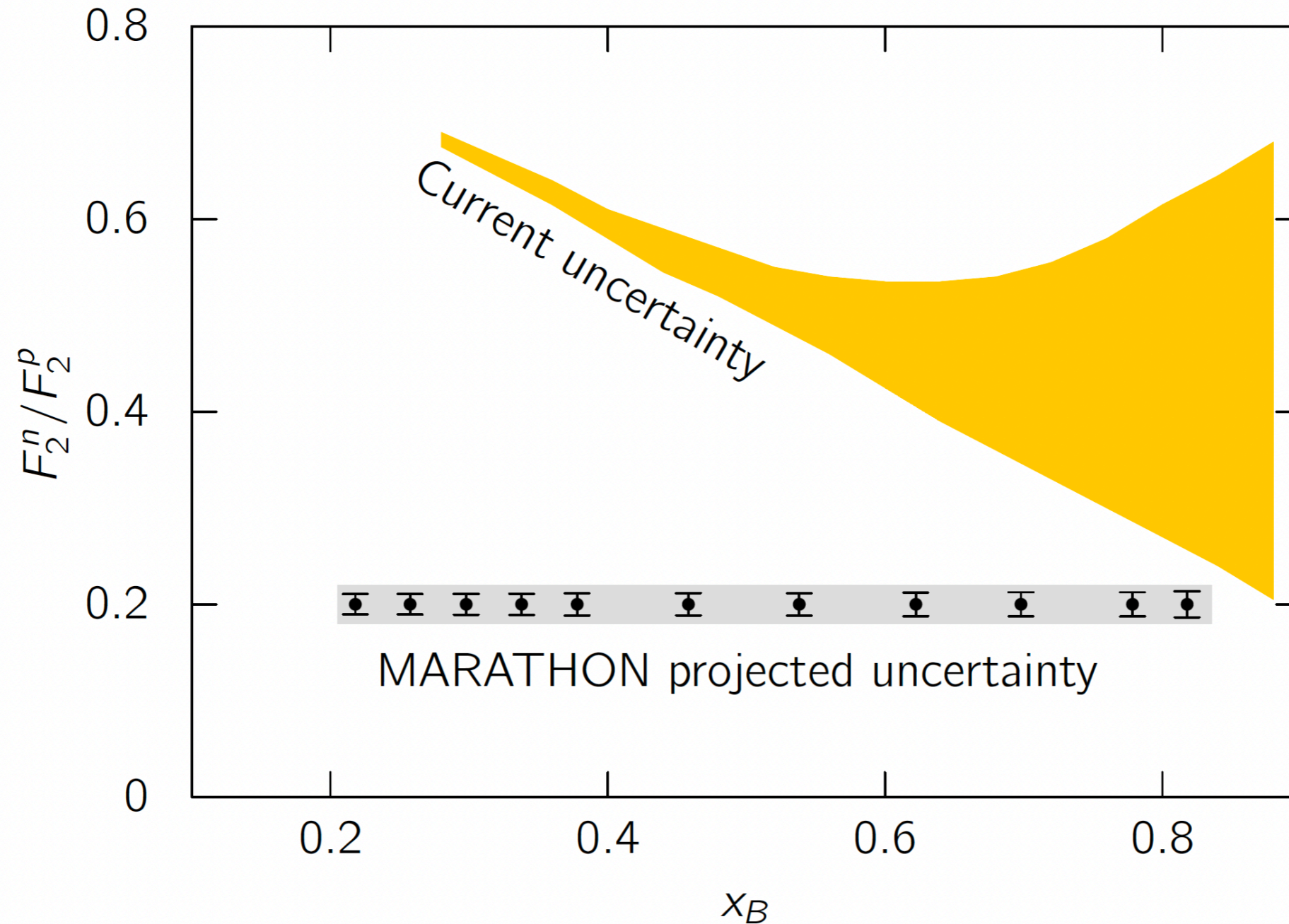
Figure quality will influence how professional you look
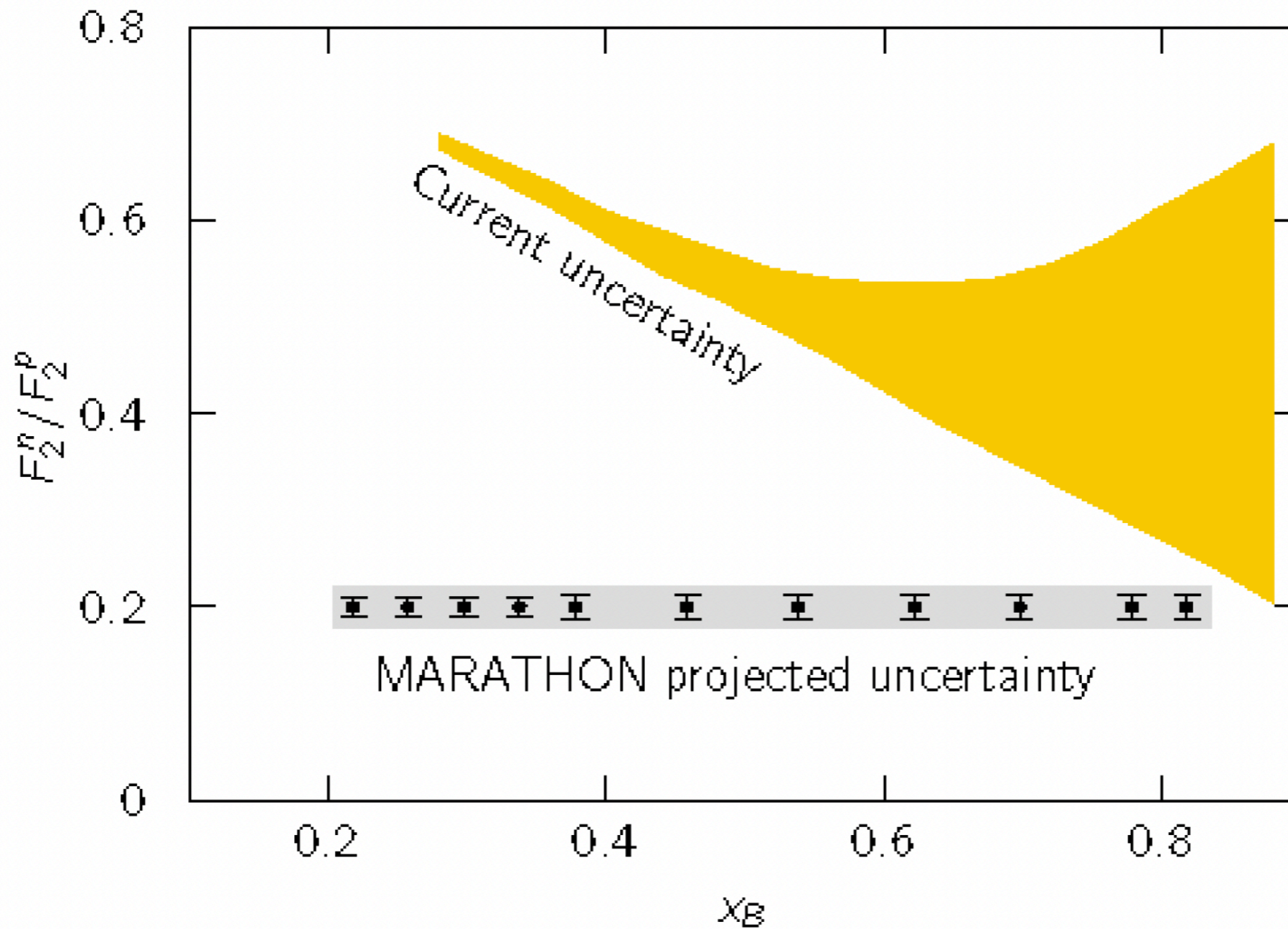
Figure quality will influence how professional you look
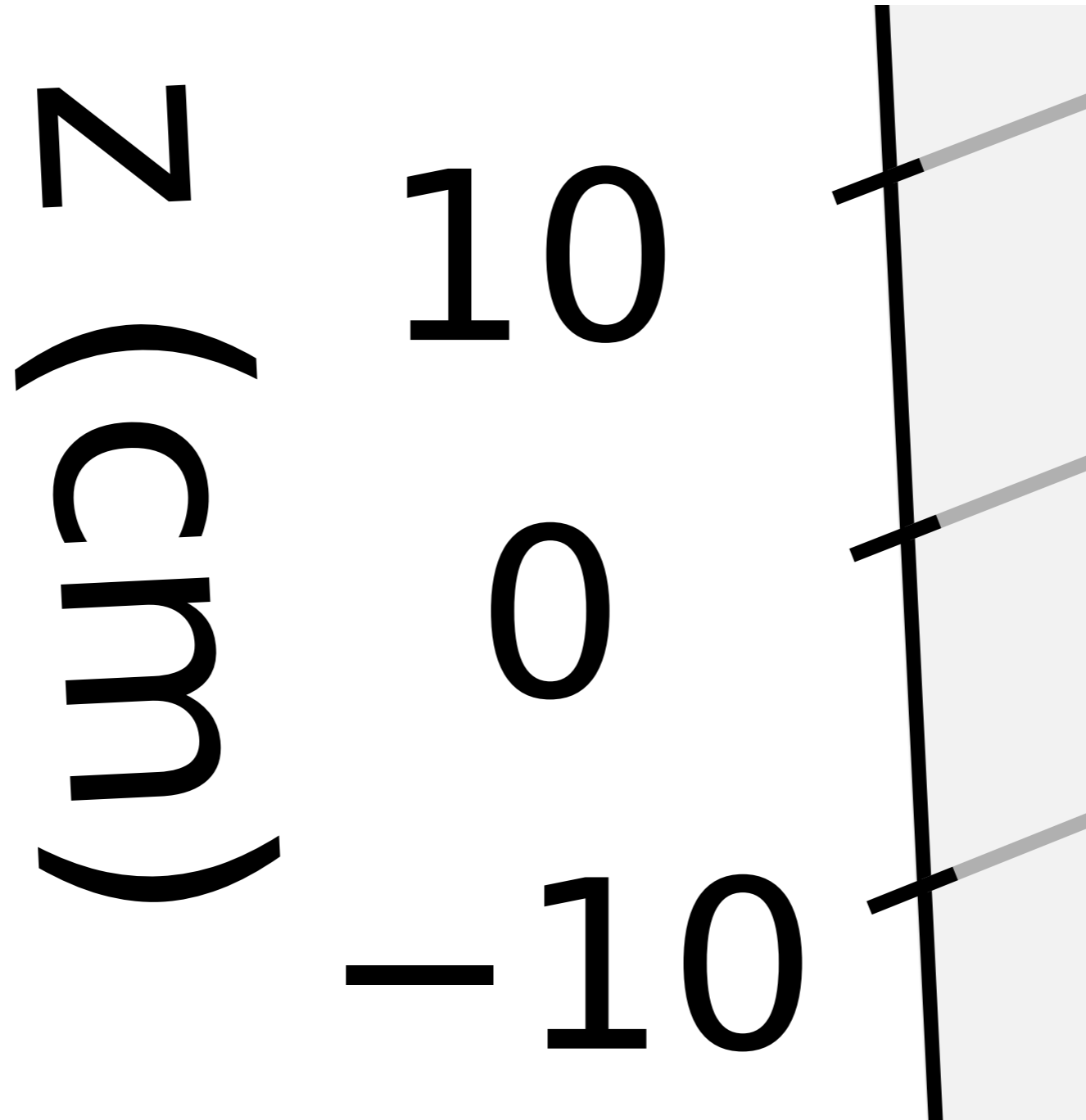
Visuals checklist

- Are the labels legible?

- Does the figure emphasize the message?

- What will my audience notice at first glance?

- Can I remove any noise?

- Is it in vector format?

Take-away on visuals

- Your audience can pay attention to **one** thing at a time

- Maximize signal, minimize noise

- If anything is:
    - Too small to be legible
    - Too overwhelming to read
    - Unexplained
  then it's noise.

Three areas that can lead to big improvements

- **Structure**: think messages not slides

- **Visuals**: support your message, don't distract

- **Performance**: the message won't speak for itself

Structure: you ought to ask yourself

- Who is my audience?

- What do I want to convince them to do?

- What is my main message?

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.
  … *so results have uncertainty due to ^{3}He wave function models.*

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.
  … *so results have uncertainty due to ^{3}He wave function models.*

- Automated conditioning increases integrated UCN output.

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.
  … so results have uncertainty due to ^{3}He wave function models.

- Automated conditioning increases integrated UCN output.
  … which makes it an ideal operation mode for the n2EDM experiment.

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.
  … *so results have uncertainty due to ^{3}He wave function models.*

- Automated conditioning increases integrated UCN output.
  … *which makes it an ideal operation mode for the n2EDM experiment.*

- Magnetic mapping has demonstrated $\vec{B}_0$ reproducibility.

Information alone is not a message

Information answers "What?"

Interpretation answers "So what?"

- Neutron spin structure is usually studied with DIS on polarized ^{3}He.
    … so results have uncertainty due to ^{3}He wave function models.

- Automated conditioning increases integrated UCN output.
    … which makes it an ideal operation mode for the n2EDM experiment.

- Magnetic mapping has demonstrated $\vec{B}_0$ reproducibility.
    … suggesting a stable magnetic environment for offline corrections.

Outline

- Introduction
- Theory
- The SQUANCH experiment
- Preliminary efficiency test results
- Deionization optimization routine
- Conclusions

An effective strategy

- Beginning

  - Main message

- Middle

- End

An effective strategy

- Beginning

- Main message

- Middle
  - Message 1
    - Sub-message 1.A
    - Sub-message 1.B
  - Message 2
  - …
- End

An effective strategy

- Beginning

  - Need

  - Main message

- Middle
  - Message 1
    - Sub-message 1.A
    - Sub-message 1.B
  - Message 2
  - ...
- End

An effective strategy

- Beginning

  - Need
  - Task
  - Main message

- Middle
  - Message 1
    - Sub-message 1.A
    - Sub-message 1.B
  - Message 2
  - ...
- End

An effective strategy

- Beginning

  - Need
  - Task
  - Main message
  - Outline
- Middle
  - Message 1
    - Sub-message 1.A
    - Sub-message 1.B
  - Message 2
  - ...
- End

An effective strategy

- Beginning
    - Opening!
    - Need
    - Task
    - Main message
    - Outline
- Middle
    - Message 1
        - Sub-message 1.A
        - Sub-message 1.B
    - Message 2
    - ...
- End

An effective strategy

- Beginning
    - Opening!
    - Need
    - Task
    - Main message
    - Outline
- Middle
    - Message 1
        - Sub-message 1.A
        - Sub-message 1.B
    - Message 2
    - ...
- End
    - Recap
    - Conclusions
    - Closing

Prepare talks around messages, not around slides

Organization checklist

- Who is my audience?

- What do I want to convince them to do?

- What is my main message?

- What are my sub-messages?

- How can I open the talk in a bold, surprising way?

Three areas that can lead to big improvements

- **Structure**: think messages not slides

- **Visuals**: support your message, don't distract

- **Performance**: the message won't speak for itself

Why do people go see talks?

To see the speaker!

Written and live communication have different strengths

Writing

- Easier to refer back to
- Detailed explanations
- Tables of numbers

Presentations

- Emotional context
- Non-verbal punctuation
- A performance

You are always in a fight to maintain focus on you!

Helpful tricks:
- **Eye contact**
- Confident gestures
- Asking audience for engagement
- Modulation
  - Pitch
  - Volume
  - Pace
- Pauses

Never underestimate the power of silence

Don't let yourself introduce noise

- Wild hand movements
- Nervous pacing
- Wandering laser pointer
- Filler words: "um", "like", "sort of"

You can't expect success without rehearsal.

You can't expect success without rehearsal.

- Find the right words
- Figure out timing, pacing
- See what works, what doesn't

Nerves are normal.
You can still play it cool.

What happens when you get interrupted or there's a technical glitch?

- Don't panic
- Pause, collect yourself
- Acknowledge if needed
- Carry on with the show

Delivery checklist

- Have I done a **timed** run-through?

- Have I memorized all the slide transitions?

- Can I avoid filler words?

- Can I make gestures, movement, pauses for impact?

- Can I speak the main messages with confidence?

To recap

- Structure around messages

- Remove visual noise

- Be a rock star

No matter how well a talk goes, there are always things to improve

My best talk

My next one

Worse

Better

May every talk be your best ever!