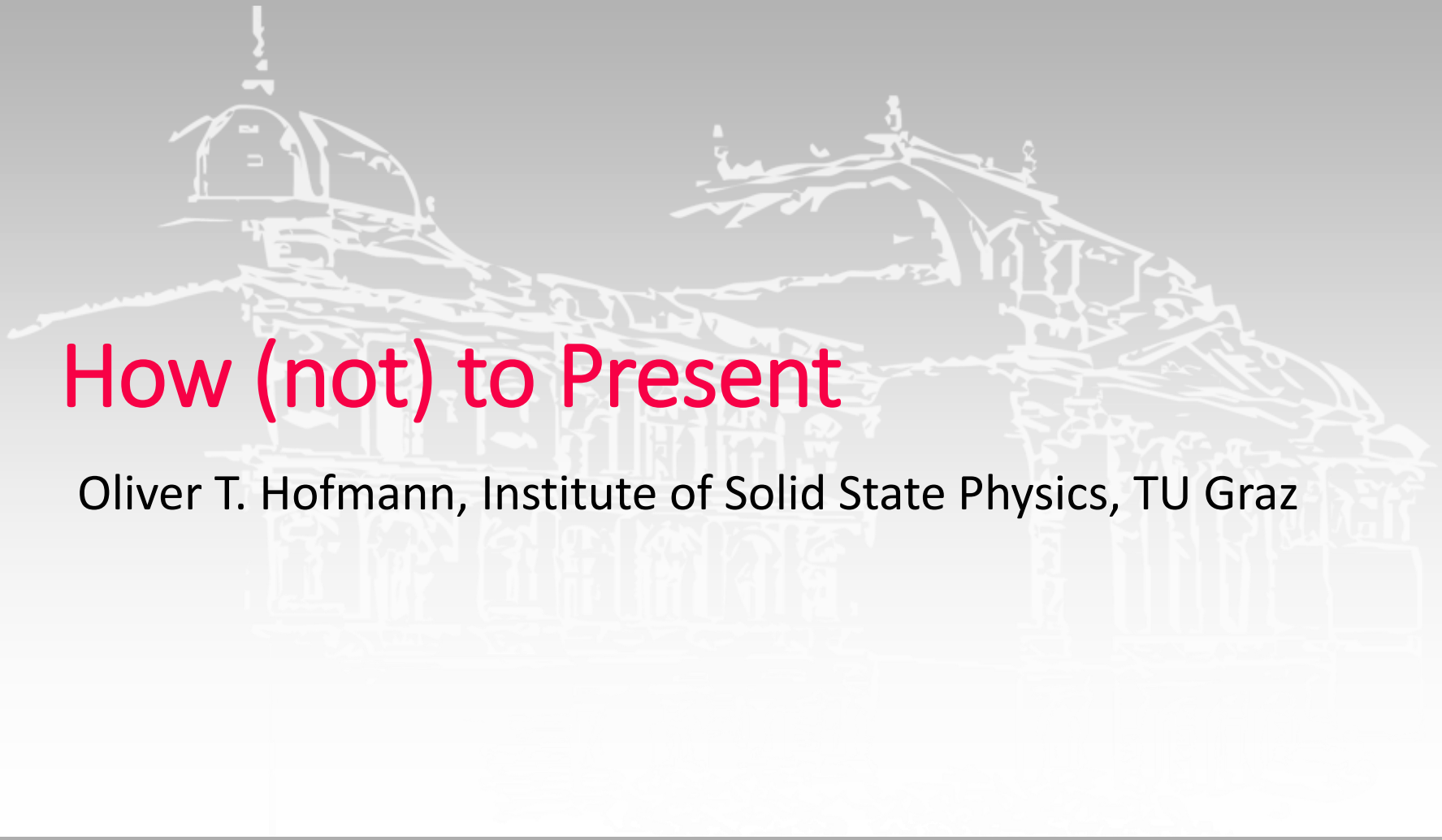
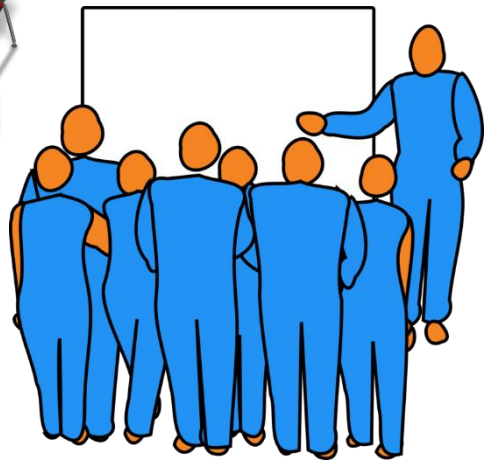


How (not) to Present

Oliver T. Hofmann, Institute of Solid State Physics, TU Graz

Presentations Everywhere



Outline

- **General Aspects**
  - **What makes a good presentation**
  - **Common mistakes**
- **Talk Specifics**
  - **Do‘s and don‘ts**

Warning: Opinions Ahead

Sources

- **Based on long discussions and similar presentations by Karsten Reuter, Karin, Reinhard Maurer, …**
- **Inspired by several recent talks at conferences**

A good presentation is …

interesting **informative**

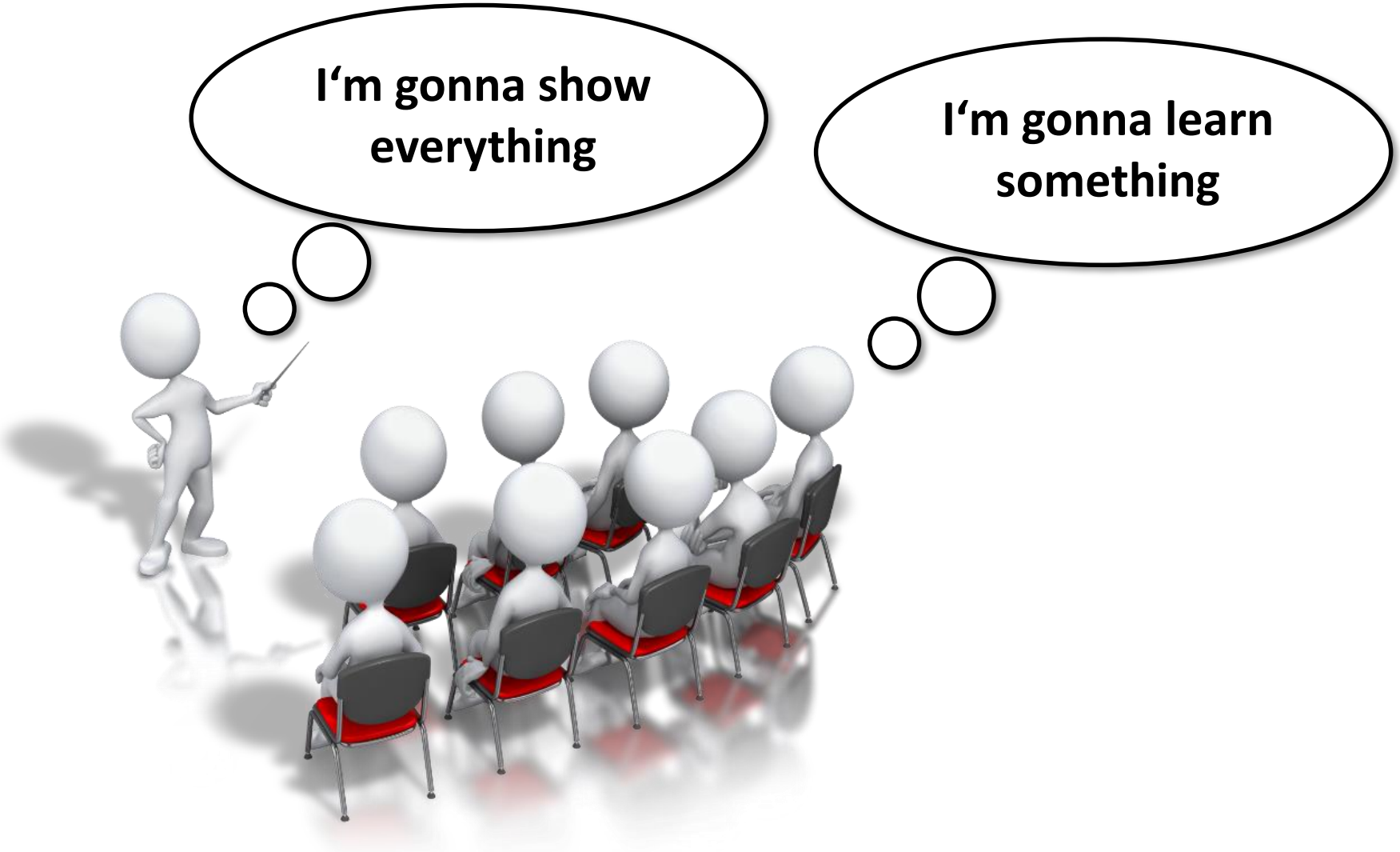
focussed **accessible**

A good presentation is …

interesting **informative**

focussed **accessible**

A typical presentation



Bad Outline (Master/PhD)

- **Introduction/Motivation**
- **Method 1**
- **Method 2**
- **Method 3**
- **….**
- **Conclusion**

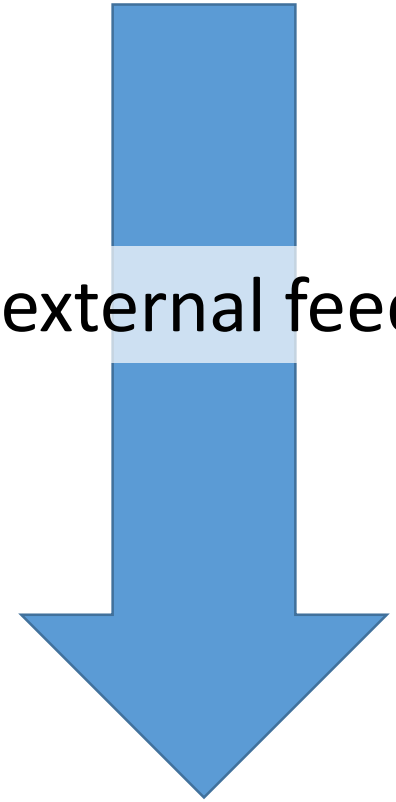
Bad Outline (PostDoc)

- **Introduction/Motivation**
- **System 1**
- **System 2**
- **System 3**
- **….**
- **Conclusion**

Bad Outline (Senior Scientist)

- **Introduction/Motivation**
- **Paper 1**
- **Paper 2**
- **Paper 3**
- **….**
- **Conclusion**

Build a story



Drive home 2-3 key messages

A good presentation is …

interesting **informative**

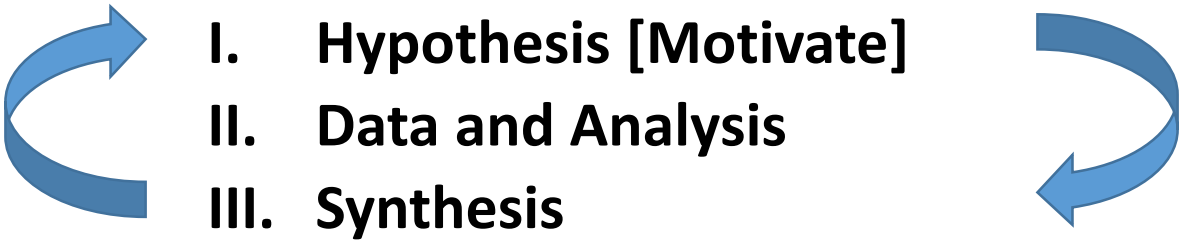
focussed **accessible**

Focus the presentation

- **Don‘t kill the audience with too many ~~slides~~ messages**
- **Don‘t overload slides**
- **Give the audience time to take graphs in**
- **Follow the red thread!**
- **Give the talk structure**

General Structure

1. **Topic and Motivation: Relevance?**
2. **Outline: Central Questions of this talk**
3. **Realization (central part)**
   I. **Hypothesis [Motivate]**
   II. **Data and Analysis**
   III. **Synthesis**



4. **Conclusion: Central answers of this talk**

You‘re biggest enemy: Attention

Keep your presentation focussed

Avoid generic slides

Method Slide (Theory)

- **DFT calculations**
- **PBE+vdW(TS) / 6-311+G****
- **3x3x1 Monkhorst-Pack grid**
- **Dipole correction**
- **More tech speak**

Intention: I know what I am doing

Only useful for very special audience with non-standard theory

Method Slide (Experiment)

Only useful for very special audience with non-standard equipment

Outline

- **Introduction (Beginning)**
- **Results (I‘m here)**
  - **Been there**
  - **Done that**
- **Discussion (…)**
- **Conclusion (End of the talk)**

What‘s a good outline?

- **Short talks (< 15 min):**
  - **No dedicated slide needed**
  - **Pose question / challenge at end of motivation**

- **Long talks (> 15 min):**
  - **Give a structured overview**
  - **Avoid long lists; less is more**
  - **Pique the audience‘s curiosity (e.g., use a graph)**
  - **Purpose: Get back into the talk**

Outline (for short talks)

Monolayer Interface (2D):
LEED, STM

Thin Films

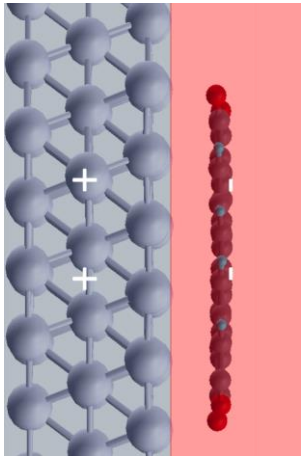
Question 1: Is there physics in thin films different from interfaces?

Question 2: Can theory help solving the geometric / electronic structure?

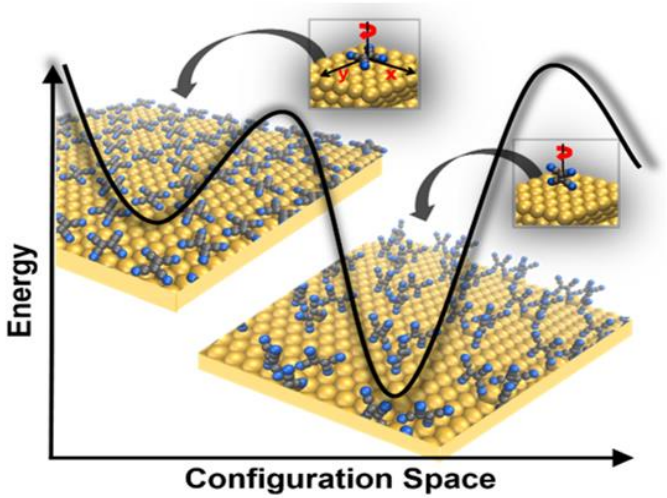
Bulk (3D):
X-Ray Scattering

Outline (for longer talks)

- **The mechanism of work function change**



- **The limits of work function modification**
  - **Towards the maximum: HATCN on Ag(111)**
  - **Towards the minimum: Pyridine on ZnO(10-10)**
- **First-principles structure search**
  - **Via basin hopping**
  - **Via machine learning**
- **Outlook: future applications**



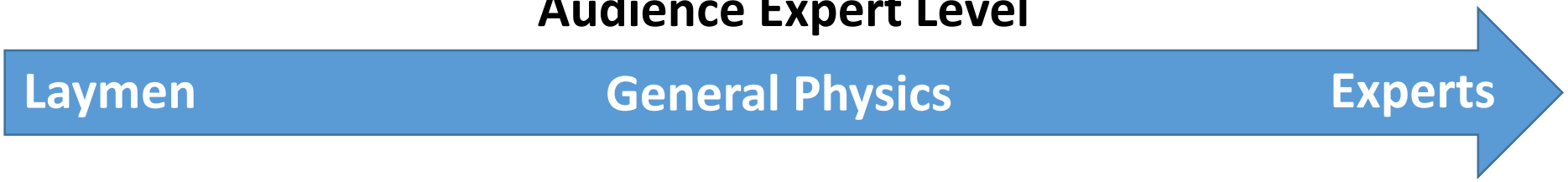
A good presentation is …

interesting **informative**

focussed **accessible**

Tailor to your audience

Audience Expert Level



Focus should be

Motivation & Topic

Method & Hypothesis

Effects & Results

Never Forget The Core Messages

The competence challenge

The competence challenge

Psychology 101

- **Everyone starts with a trust bonus – don‘t loose it**
- **Make the audience feel comfortable**

1. **Be confident – trust in yourself!**
2. **Write down & repeat important messages**
3. **Clear and easy to grasp slides**

#1 Rule: Maximize ease of reading

Speed kills

- **Find good speed of narration**
- **Give the audience pause**
- **Avoid or explain jargon and abrv.**
- **Put important messages in prominent positions.**

Outline

- **General Aspects**
  - **What makes a good presentation**
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- **Talk Specifics**
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Warning: Opinions Ahead

Starting into a talk

- **Don‘t repeat chairman or title**
- **The first words are difficult: use a phrase**

THANK YOU, MR. CHAIRMAN, FOR THE NICE INTRODUCTION

- **Rookies: Learn the first ~5 sentences by heart**
- **Novices: Prepare a joke**

WARNING: THIS CAN GO WRONG AND MUST FIT YOUR SENIORITY LEVEL

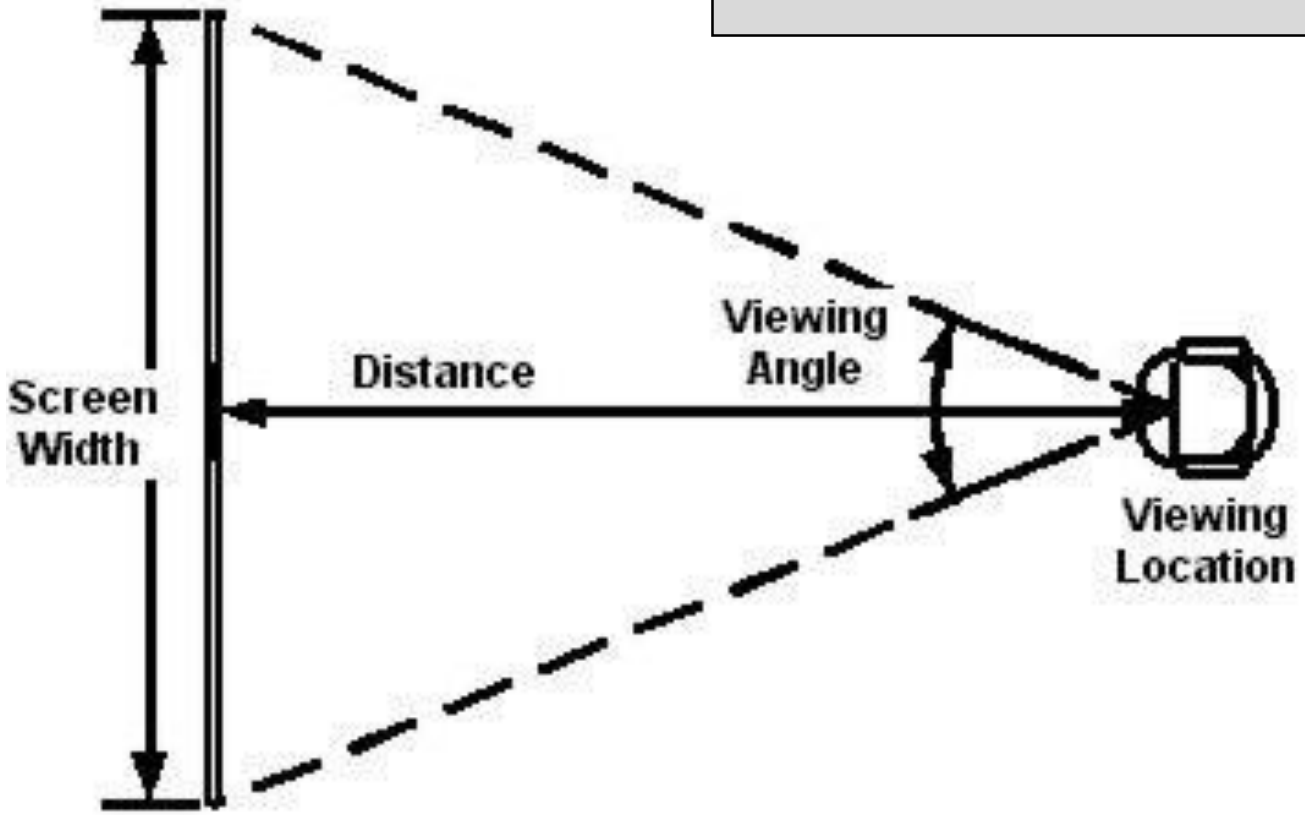
Slide Design: Do‘s

- **Only one idea per slide**
- **Write main message down**
- **Images instead of text, but**
  - **Images must be self-explanatory**
  - **Simpler and bigger than in papers**

Always talk about what the audience sees
Always show what you‘re talking about

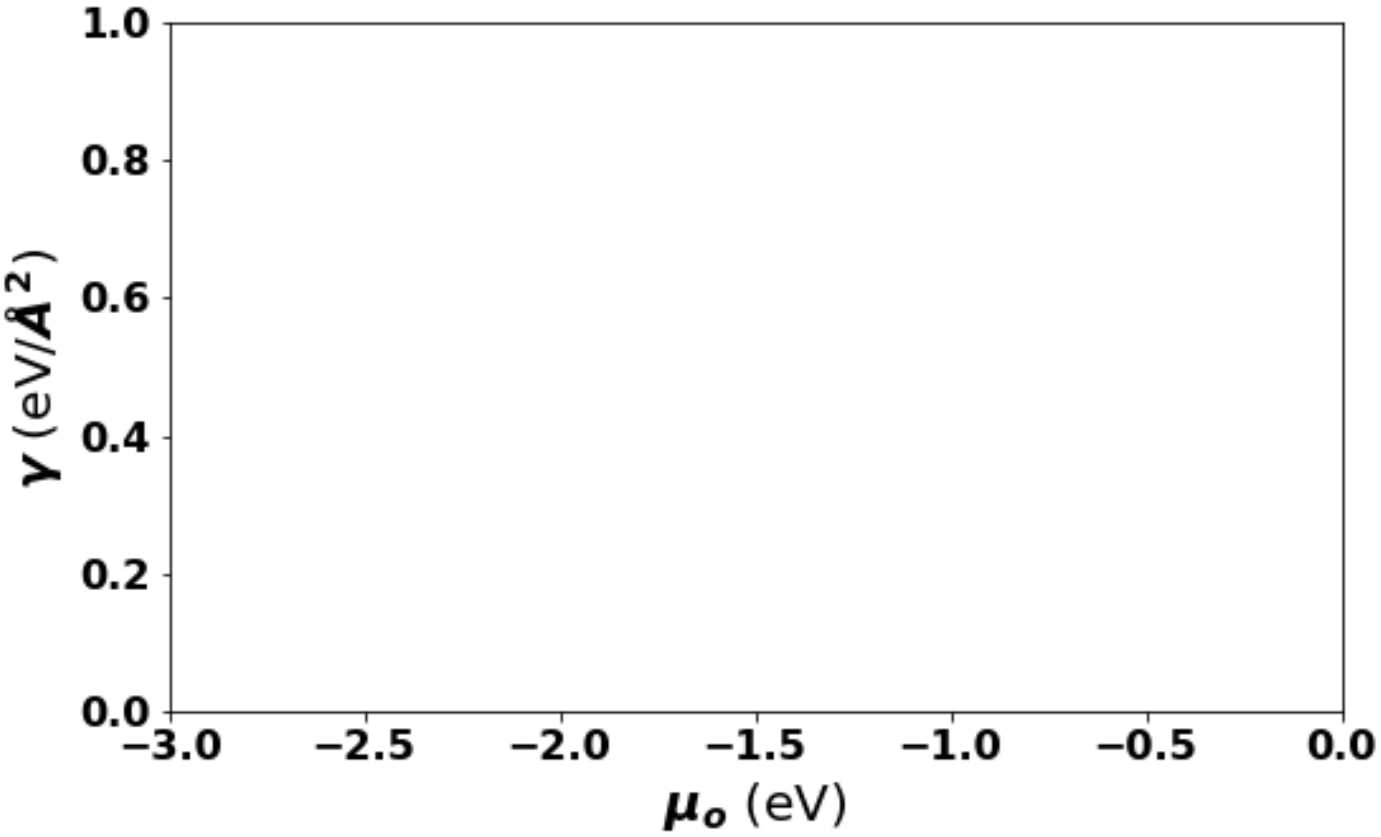
Size matters

Monitor: Chair = 1 : 2
Canvas to Chair = 1 : 4+

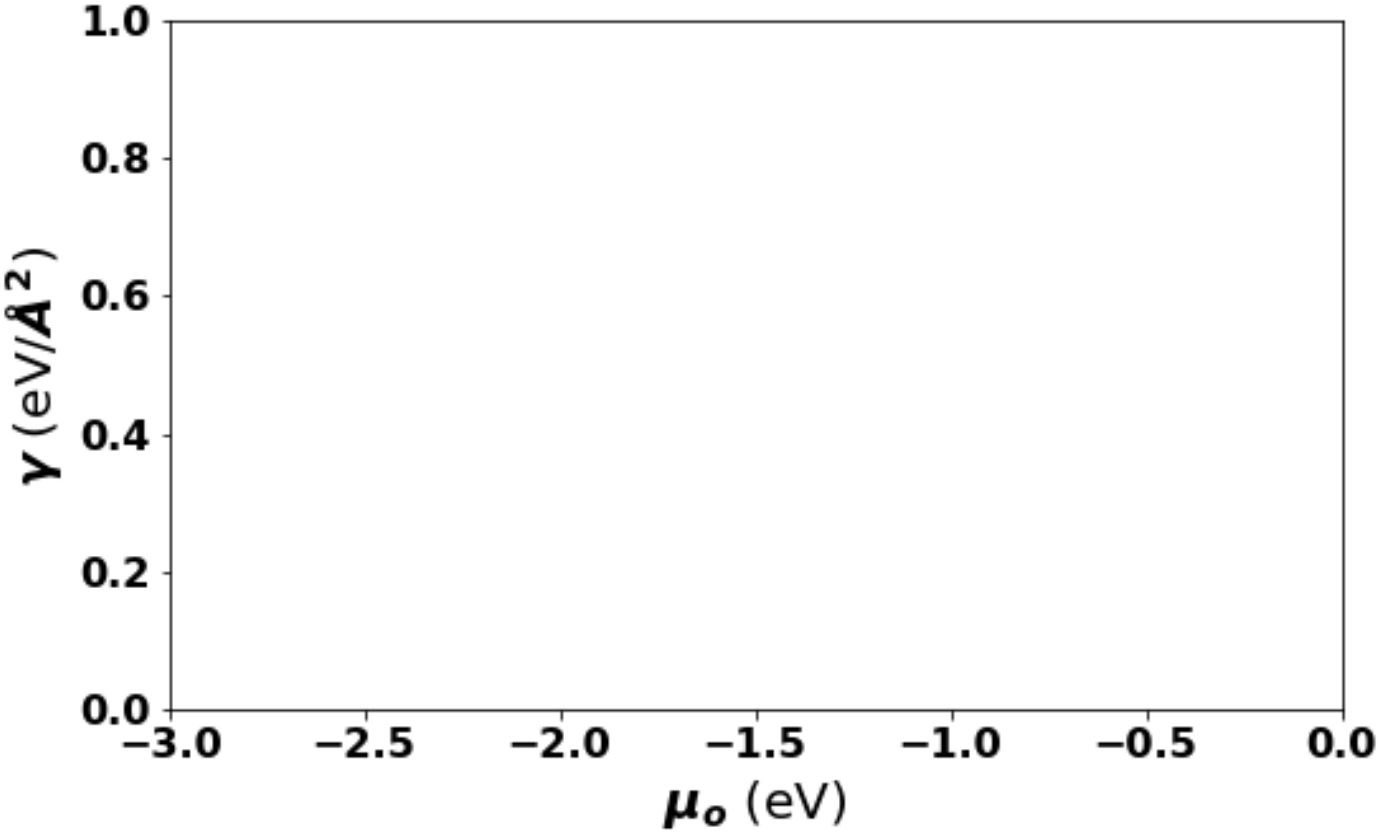


Text for presentation must be ca. 2.5x as big

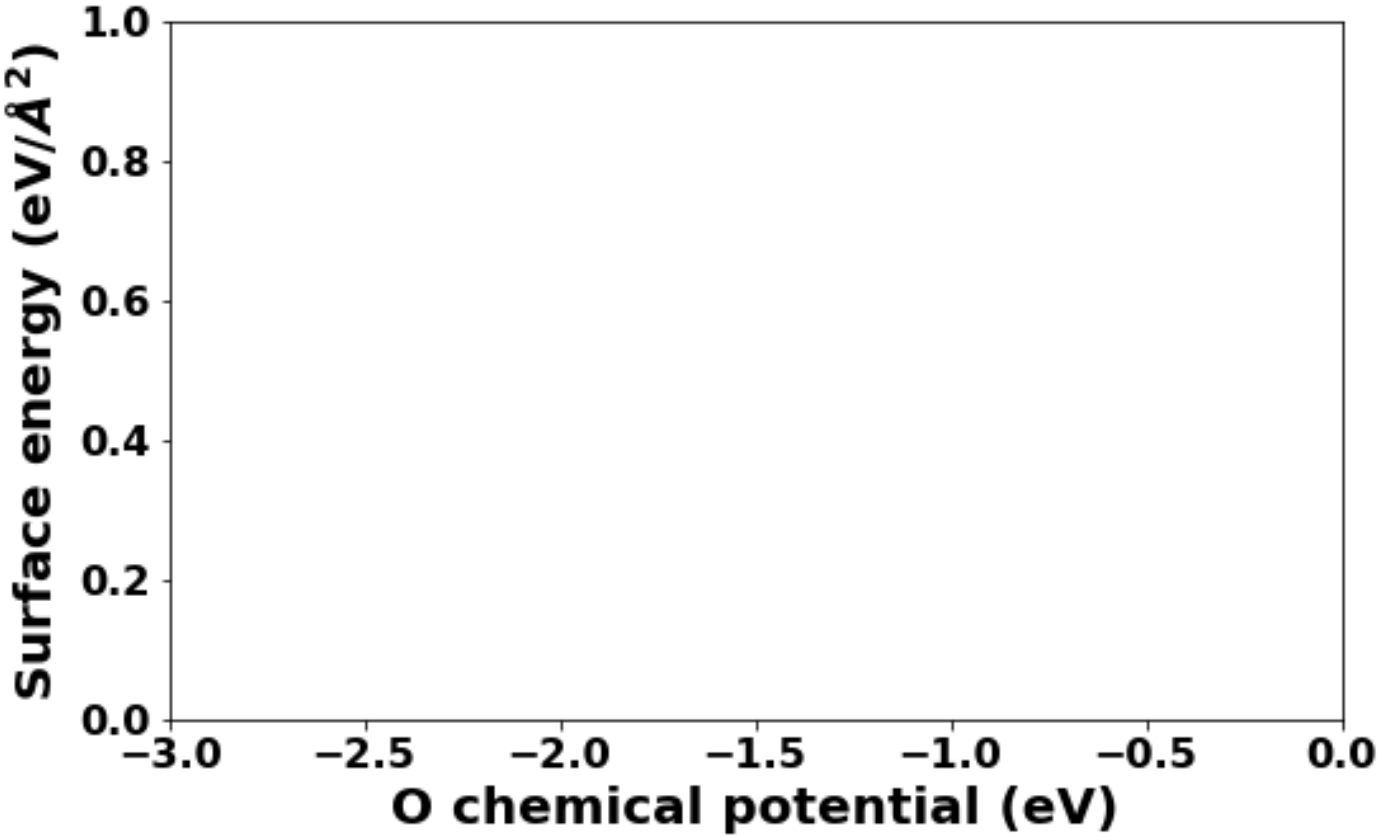
Graphs as the main tool



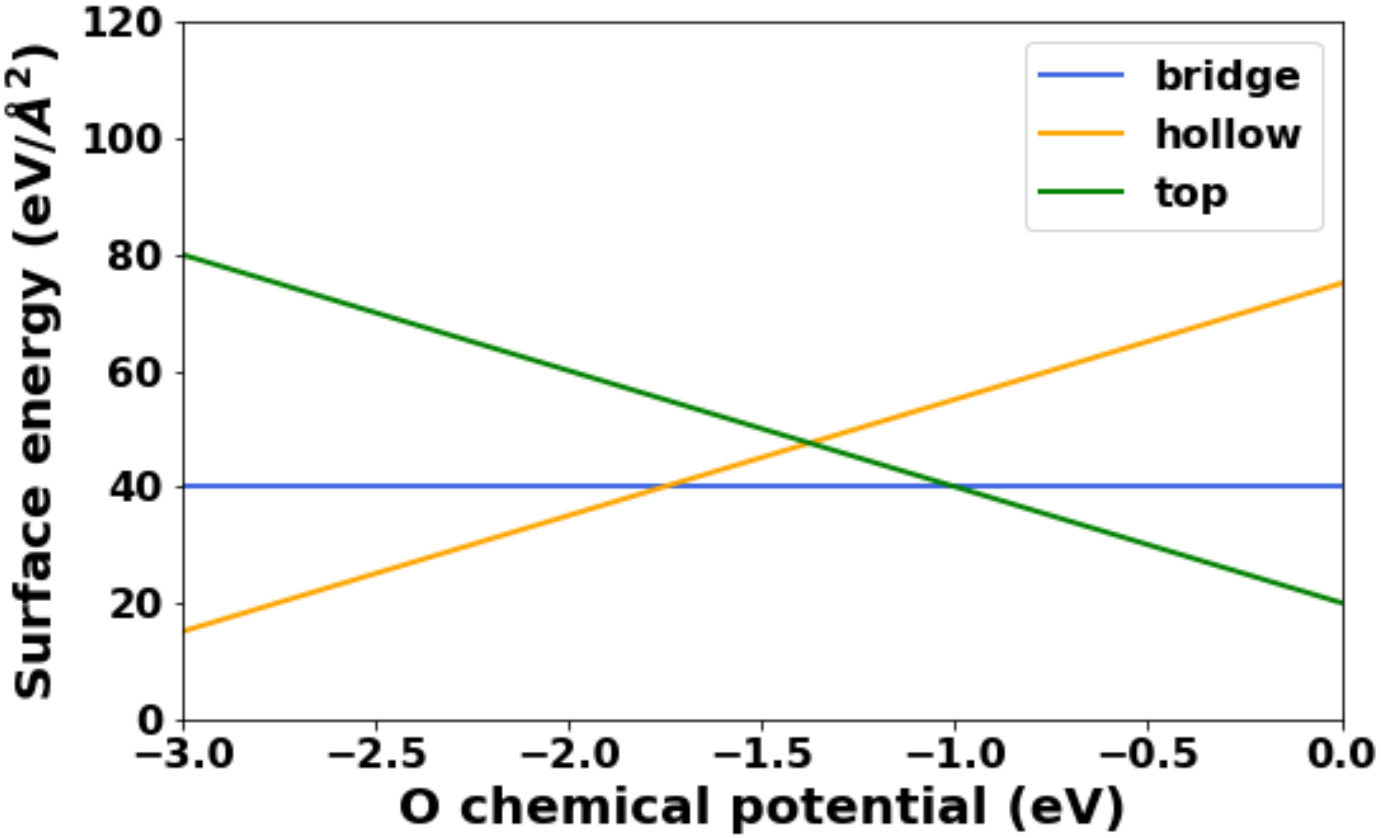
Explain the axes



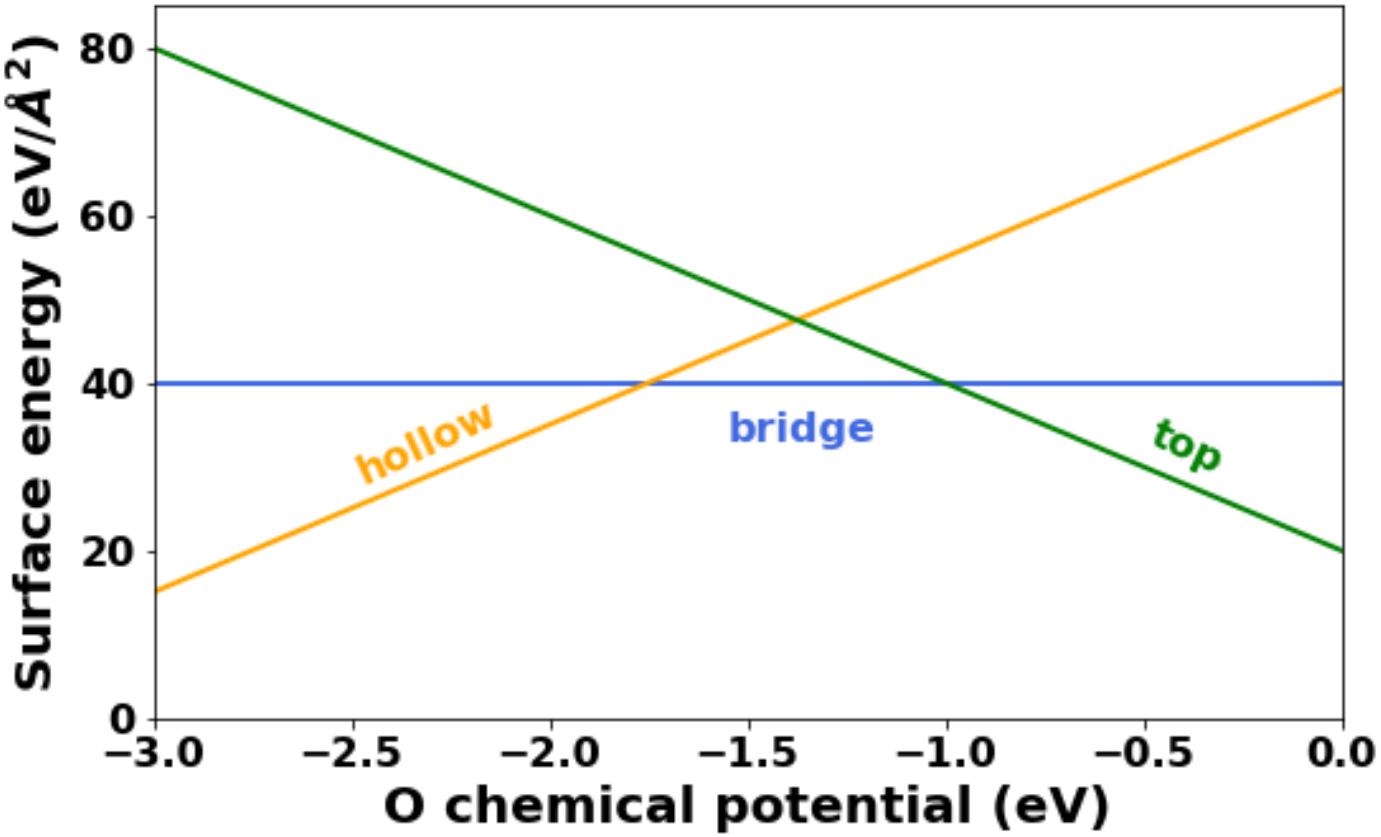
Explain the axes



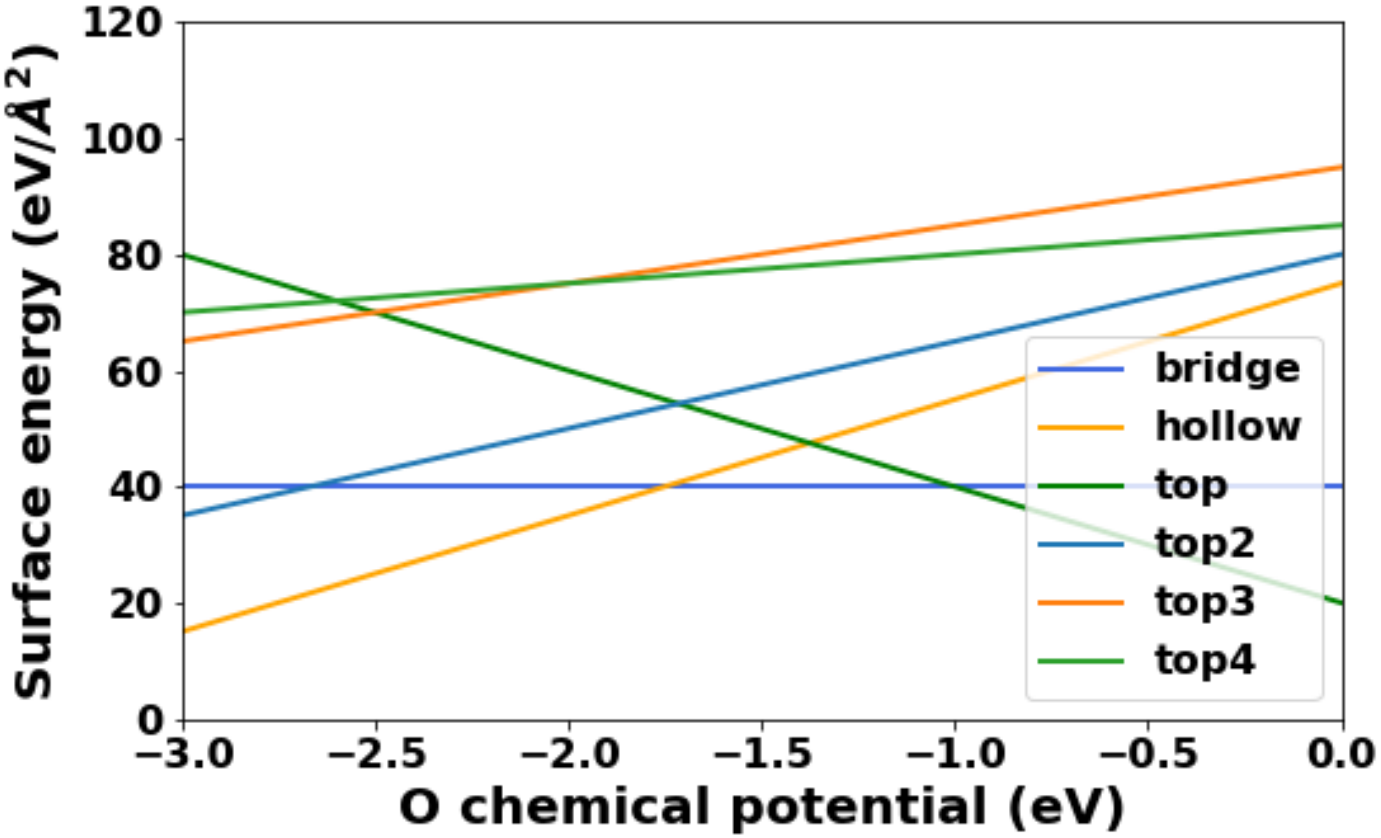
Explain the displayed data



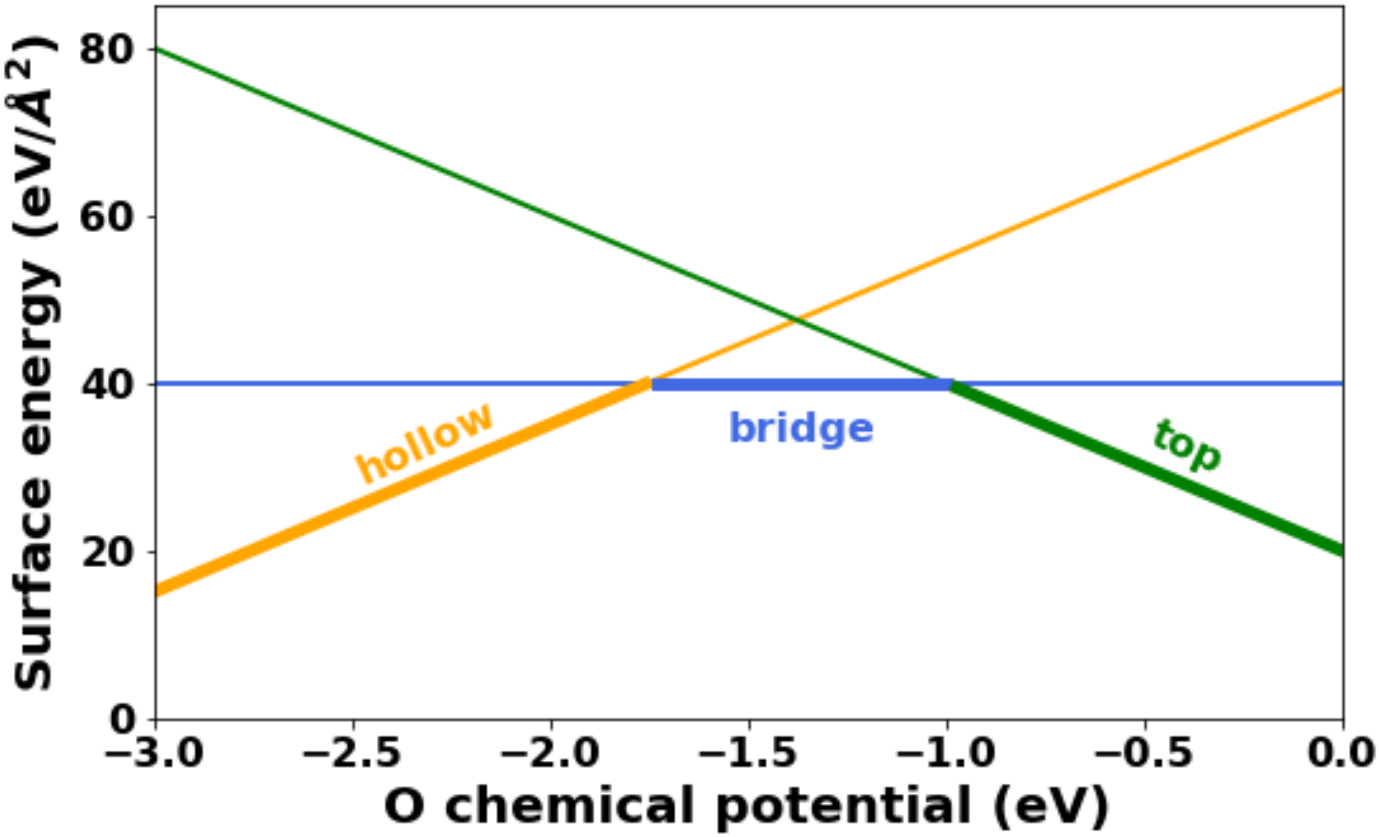
Explain the displayed data



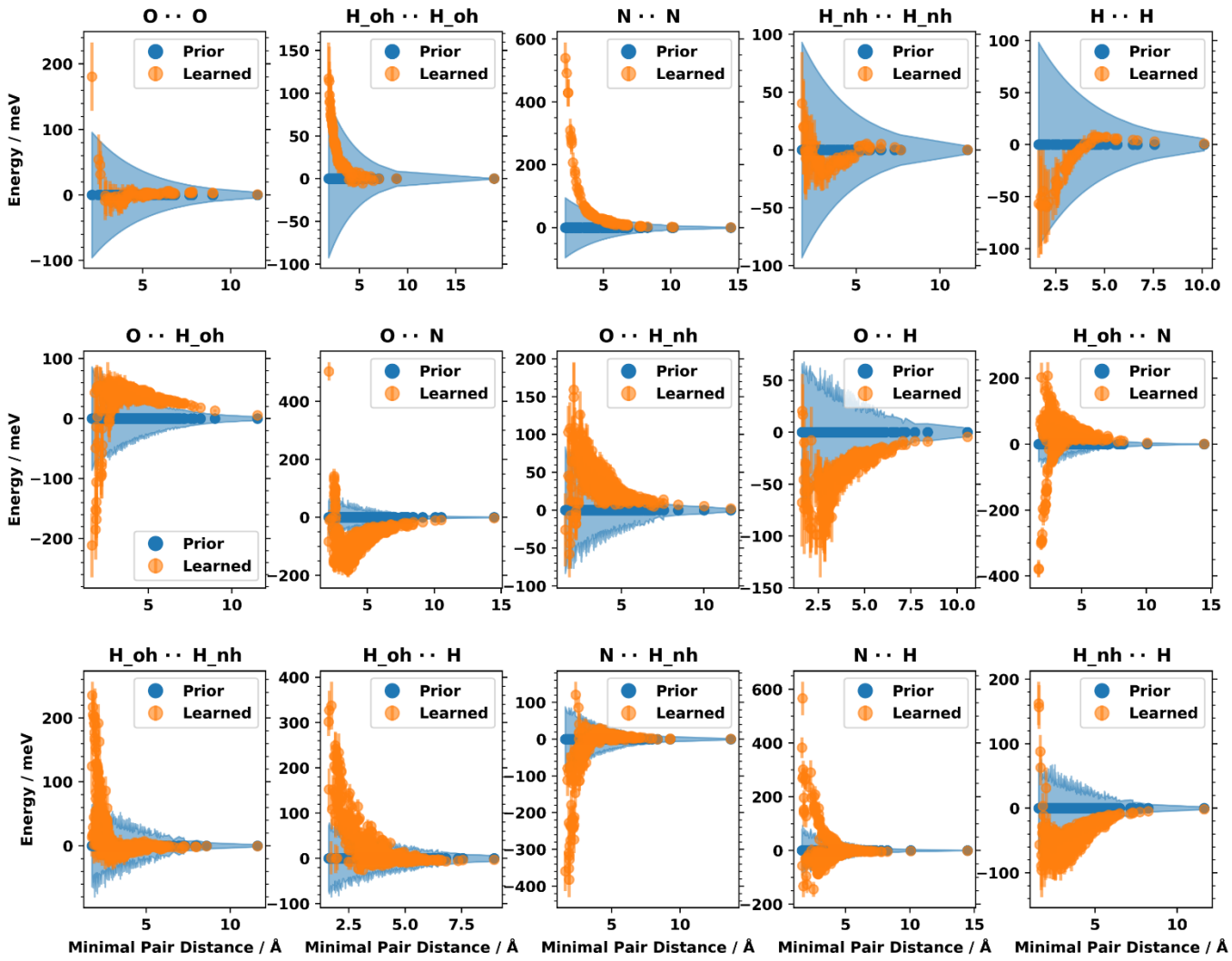
Don‘t use too many lines



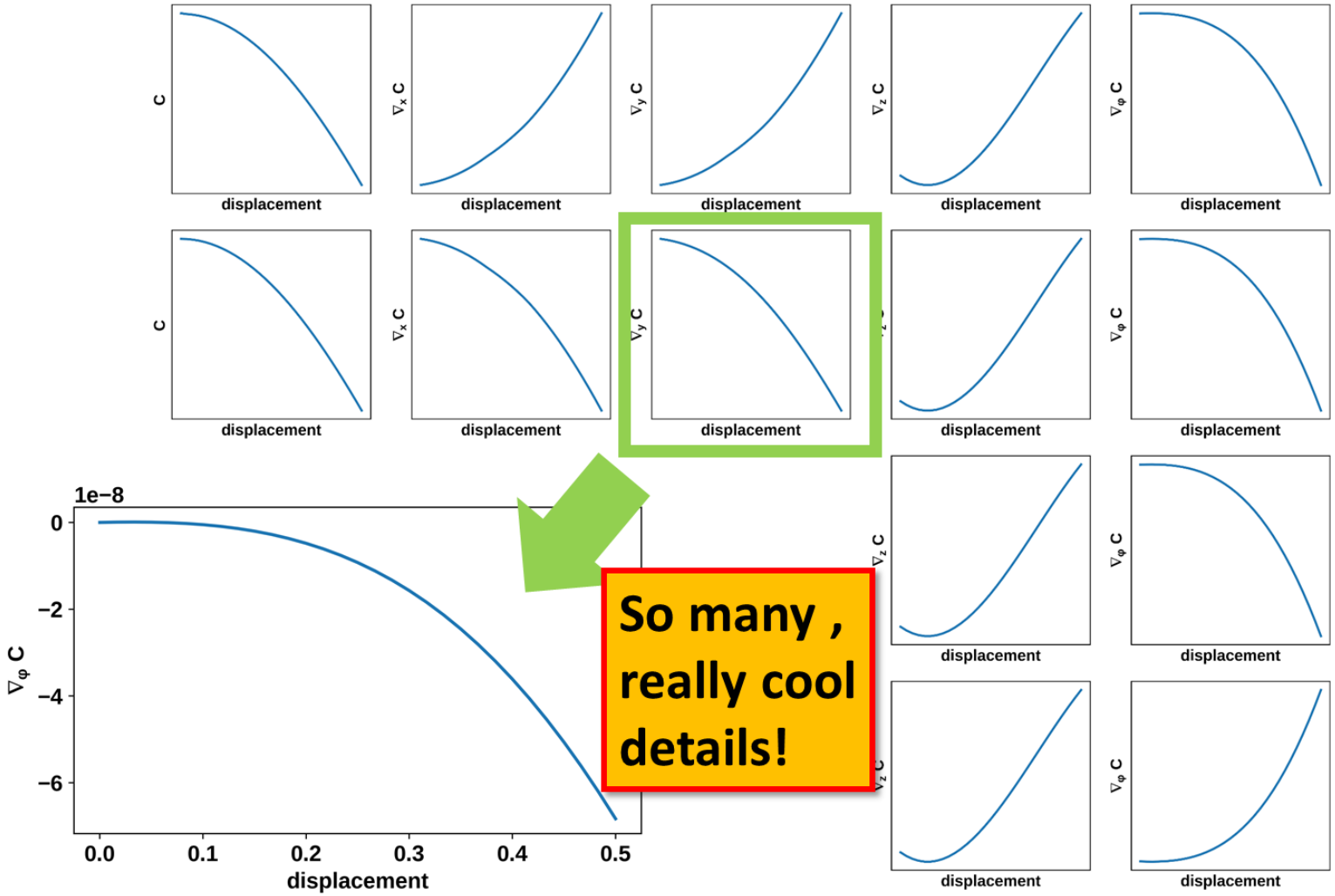
Highlight the important result



Explaining takes time!

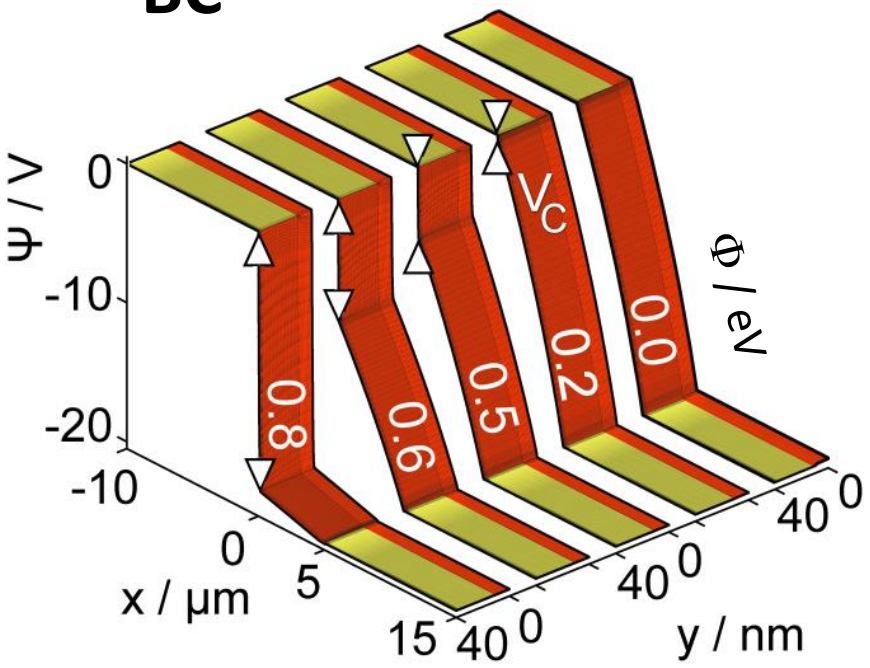


Also no solution…

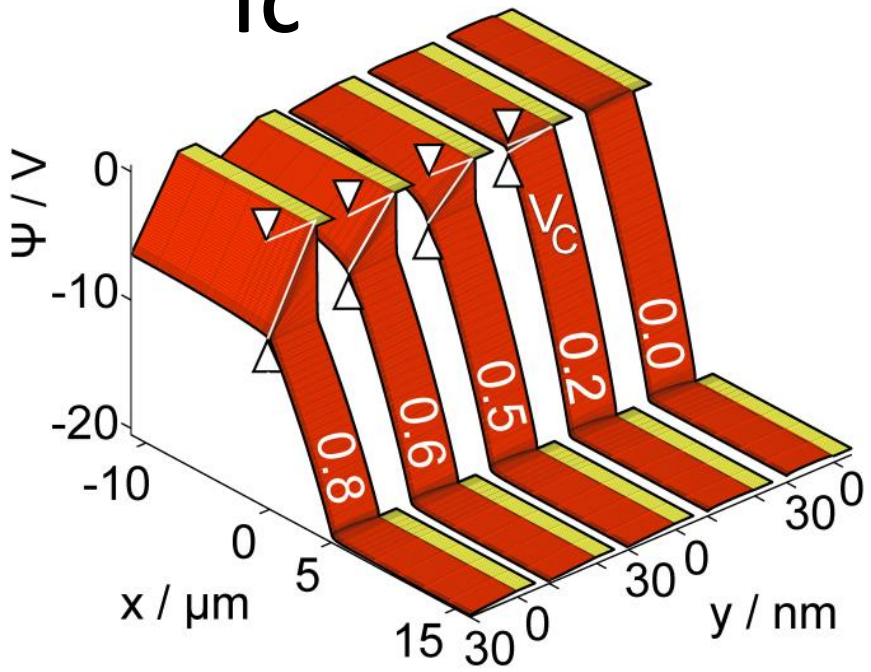


Keep graphs simple

BC



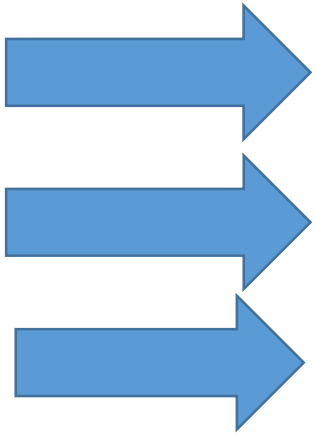
TC



μ = 1cm^2/(Vs); d_{ins} = 147 nm; d_{OSC}= 30 nm; L = 5 µm; W = 7 mm; V_{DS} = -20V; V_{GS} = -40 V;

Color and contrast

- **Old beamers often have poor contrast**
- **Beamers use different colors than monitors**



green and light colors

Greyscale images

backgrounds with varying color

Important Equations…

This is the first step:

$$a^r \cdot a^s = a^{r+s}$$

Next, this is calculated

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, \qquad -\infty < x < \infty$$

… we also do this …

$$\sin\alpha \pm \sin\beta = 2\sin\frac{1}{2}(\alpha \pm \beta)\cos\frac{1}{2}(\alpha \mp \beta)$$

… and this …

$$(1+x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots$$

Also don't forget these (these are important):

$$(x+a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k}$$

$$x = \log_a b \Leftrightarrow a^x = b$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

This is probably the most important):

$A = \pi r^2$ ⬅ Very important!

$$\cos\alpha + \cos\beta = 2\cos\frac{1}{2}(\alpha + \beta)\cos\frac{1}{2}(\alpha - \beta)$$

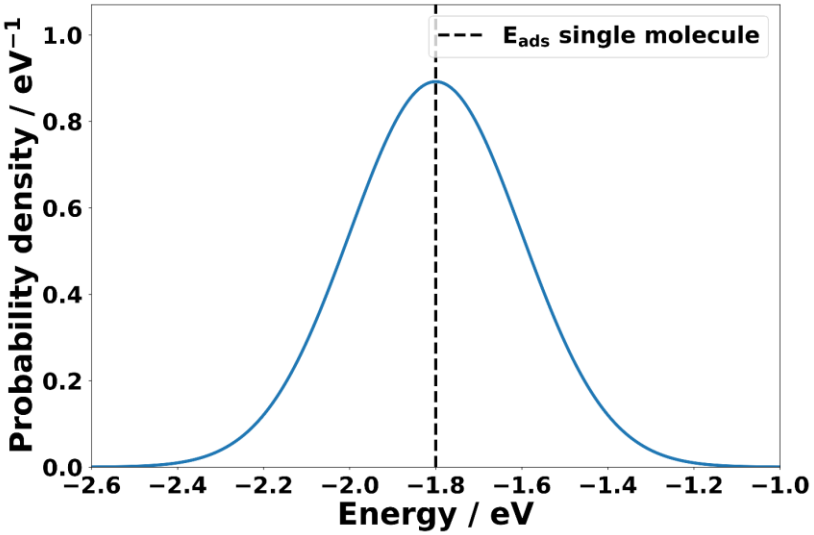
$$f(x) = a_0 + \sum_{n=1}^{\infty}\left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L}\right)$$

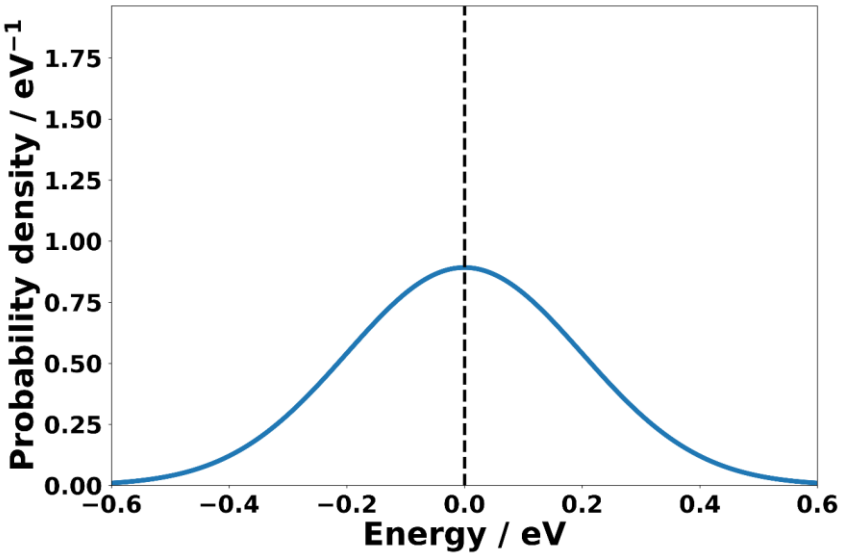
Finally:

$$a^2 + b\text{^}2 = c^2$$

Equations in Talks

- **No one can follow derivations!**
- **Generally: Avoid equations if possible**
- **If not, explain every symbol**
- **Use highlighting and visualization**





$$\mathbf{E} = \sum_{\mathbf{i}} \mathbf{n_i U_i} + \sum_{\mathbf{p}} \mathbf{n_p V_p}$$

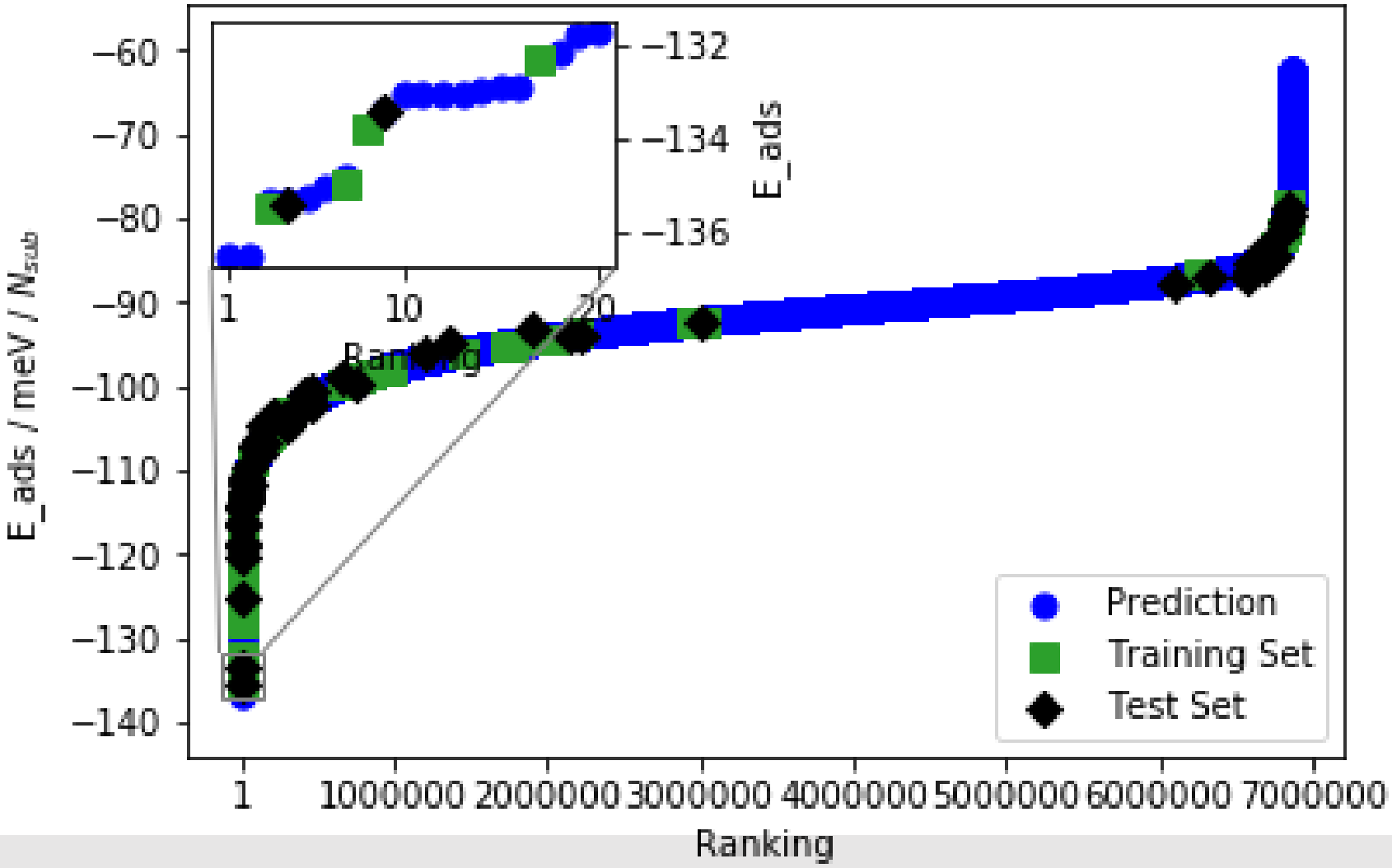
Similar to isolated molecule

Individual terms are small

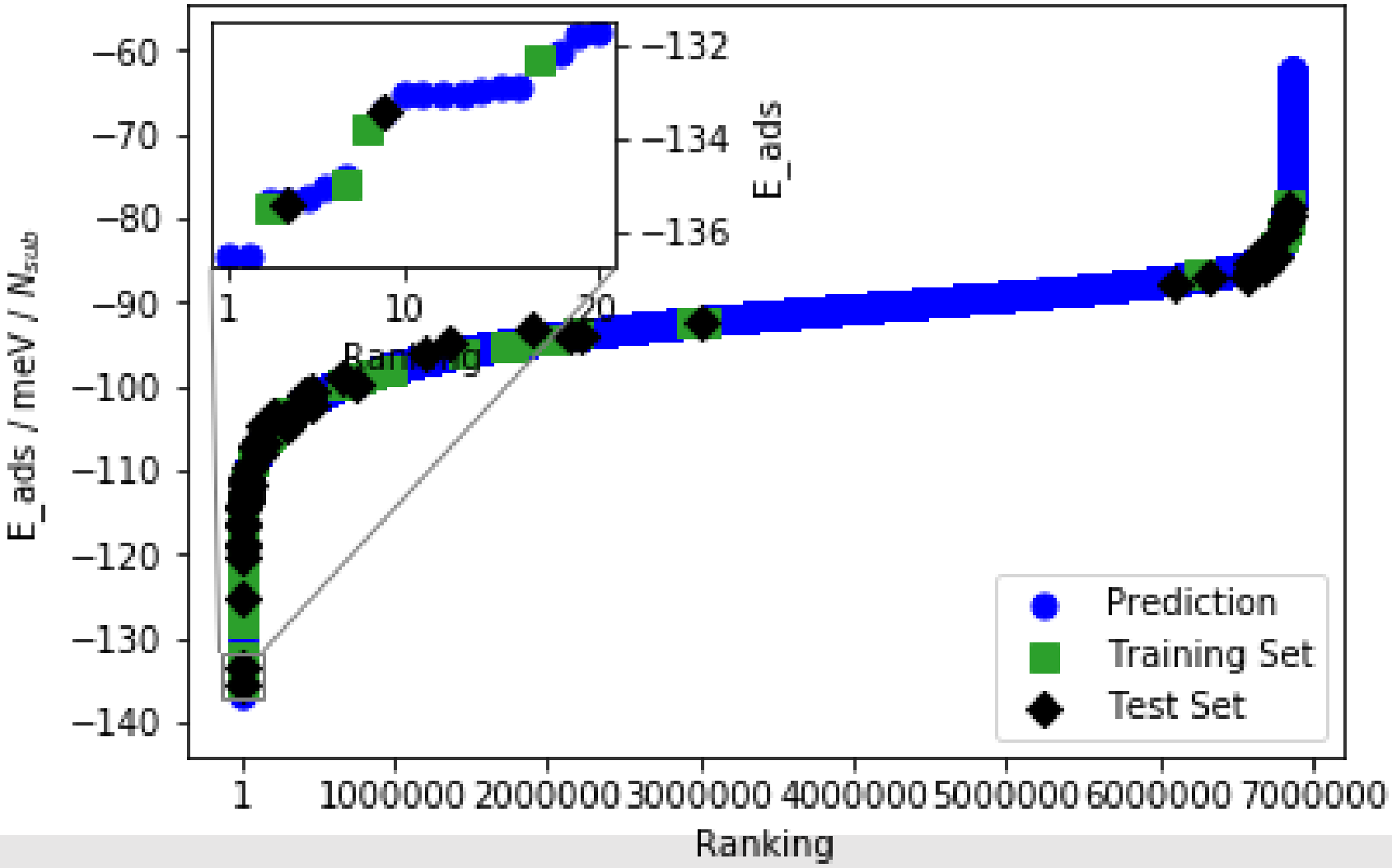
Animations

- **Useful to build up slide and direct focus**
- **Useful to explain processes**
- **Don‘t talk while animating**
- **Animate FAST**

This Slide is Brought to You by: SAMPLE

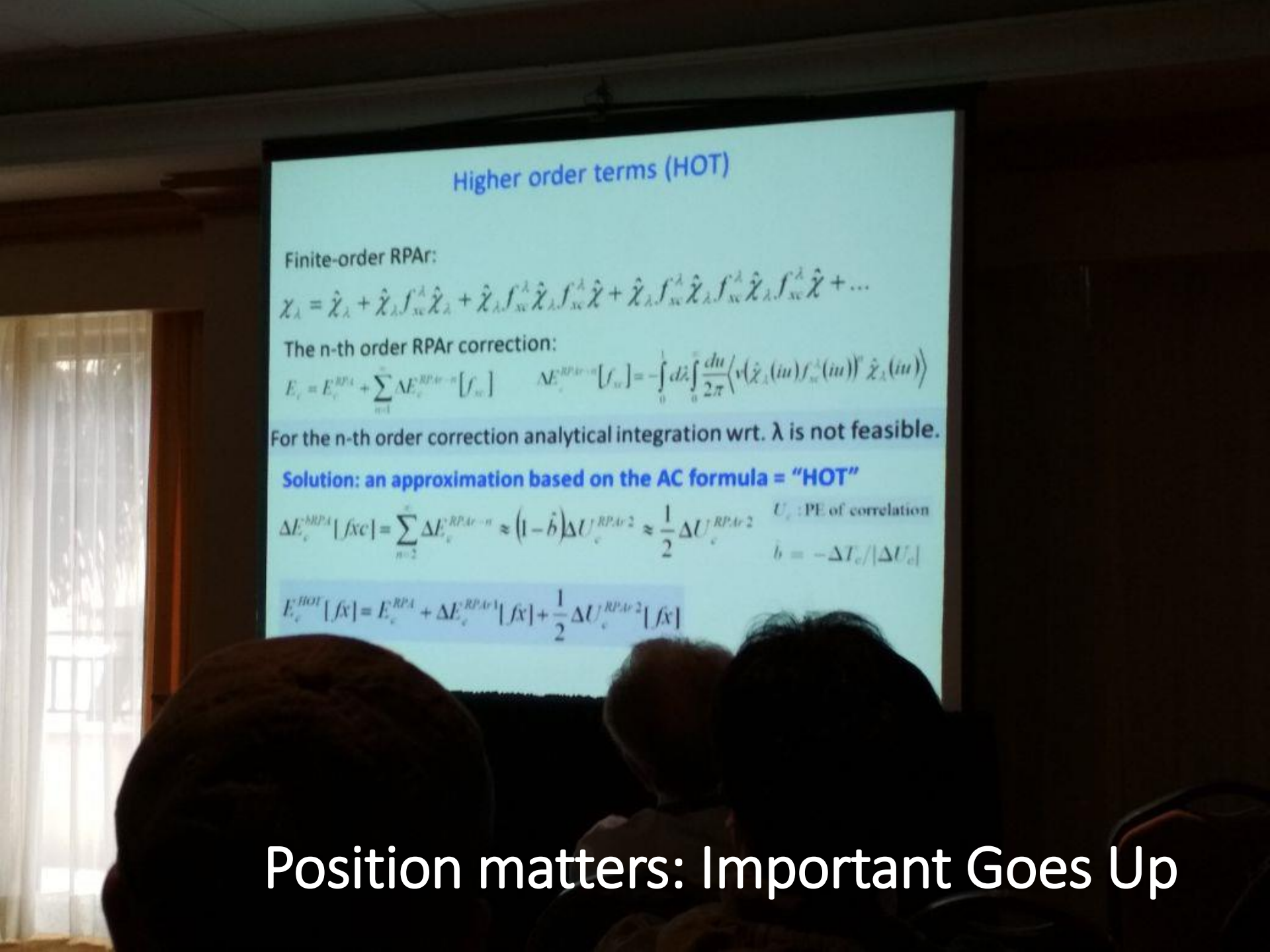


This Slide is Brought to You by: SAMPLE



Transitions are important

- **Never say: „We also looked at X“**
- **Explain why you switch slide (what‘s new)**
- **Give the audience a break**
- **Create expectation**



Position matters: Important Goes Up

Use new media wisely…

How to give the conclusion

- **Write down key messages**
- **Connect to outline!**
- **Can be connected with acknowledgements**

Wrapup

- **General aspects:**
  - Tailor talk to the audience
  - Focus
  - Be confident
  - Avoid generic slides
- **Talk Specifics**
  - Readability is key
  - Bgger is better
  - Less is more

Warning: Opinions Ahead

More tips at www.if.tugraz.at/tips.html