Some rules of good scientific viewgraphs

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I. INTRODUCTION

In an oral scientific presentation, one usually uses viewgraphs as visual aids to present ideas, explain problems, and report results. These viewgraphs are essential for successful communication and, if not prepared properly, can actually hinder information exchange between the speaker and the audience. In this brief note, we outline some common-sense rules for preparing effective viewgraphs, in the hope that this will help scientists avoid common mistakes. Unfortunately, such mistakes are often committed by novices and experienced scientists alike.

Presentation is different from writing, but viewgraphs for the presentation still have to comply with general rules in scientific writing, some of which can be found in Ref. [1]. We do not repeat those rules here. While posters are yet another genre, some of the rules for poster presentations are similar to the ones for viewgraphs.

II. THE RULES

☐ **Know your audience!** The gaps between different scientific communities are huge, therefore your audience are usually less familiar with aspects of your work than you might expect.

☐ **Always start your presentation with an introduction!** You have been working on the topic recently, but your audience, for the most part, have not.

☐ **Stick to the big picture, and keep minimal detail!** You will likely not need them but you can prepare "back-up slides" with details, in case you are asked about them.

☐ **Remember the key questions!** Presumably, you want the audience to walk away with a particular take-home message. It may be useful to frame this message as answers to a few questions: Who? (did the work); Why? (the motivation); How? (the method); What? (the results); and importantly, Who cares? (the significance of the work). It is advisable to keep the take-home messages simple, lest they will be lost.

☐ **Keep the density of information on viewgraphs low.** A typical viewgraph would have a minimal-detail diagram or a plot and some "bullet-form" text on two-four lines. For most speakers, properly presenting such a viewgraph takes 1-2 minutes. The reason for using the bullets is that you need the audience to focus on the speech instead of reading the text on the viewgraphs. Additionally, if a person sees "a wall of text" they often perceive it as such and are not able to absorb the written information.

☐ **Use "bullet language"!** To minimize the amount of text, it is a good idea to omit articles, periods at the end of a bullet, and unnecessary adjectives in the bullet text. On the other hand, the use of, for example, (animated) arrows and other symbols is encouraged to show logical relationships. Interestingly, some successful presenters advocate to use graphics tools such as pie-charts and relationship trees instead of bullets. See what works best for you!

☐ **Select the material for the viewgraphs with utmost care!** Indeed, if you have a 12 min talk (a standard, for example, at the American Physical Society meetings), you will only be able to show half-a-dozen slides!

☐ **Minimize the use of equations!** The (half-humorous) folklore is that with each equation used, one loses half the audience. If the use of equations is unavoidable, make sure that every symbol in the equation is defined.

☐ **Harness the power of animation!** Anything that moves on a viewgraph tends to draw full attention of the audience. While this could be a powerful presentation aid, one has to use it with caution as it can be distracting.

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☐ **Use a picture on every viewgraph!** It is human psychology: viewgraphs without pictures are boring.

☐ **Be compassionate!** It is advisable to use large font for the text, avoid small details in graphics and use a high-contrast color scheme, as some in the audience may have peculiar color perception (as is the case for one of the authors).

☐ **Add page numbers on every slide!** This makes it easier for the audience to ask questions at the end.

☐ **Put sources of references on the same view-graph where you quote them!** You really do not want to upset the authors of those papers who came to listen to you. When it comes to graphics and images, one should also worry about the copyright issues—it is the law!

III.   CONCLUDING REMARKS

Good viewgraphs do not have to be fancy, and may not take too much time to make (see Fig. 1). Following the rules above would likely result in decent viewgraphs. However, good viewgraphs are only one of the elements of success. Practicing a presentation is really helpful! But do not overdo it—a bit of improvisation could better connect you with the audience.
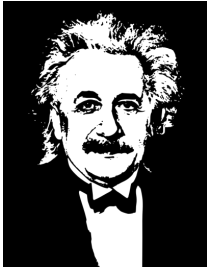
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[1] D. Budker, Some rules of good scientific writing (2008), arXiv:physics/0608246.

FIG. 1. An example viewgraph with an equation. The equation is elucidated with accompanying text and arrows, while figures are included to engage the audience. Additionally, the reference and the page number are provided at the bottom. Overall, the viewgraph maintains moderate information density.