

@prism project

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The `oprism` project¹ provides small size color palettes that can be used to create expressive color maps for graphics in different contexts.

Last changes

1.2.1
2025-11-09

🔧 Fix.

- Equal palettes: the floating point equality uses now a correct tolerance.

⚠ Break.

- Palettes: the extra `Greys` has been removed (it is equal to `Grays`).

💎 New.

- Similar palettes: two PDF files show similar palettes in standard and black modes (semi-automated process used).

⟳ Update.

- `luadraw` product: the associative array `palNames` has been added for compatibility reasons with the `luadraw` package.
- `BlindFish` palette: the last color variation has been made smoother (`luadraw` process used).

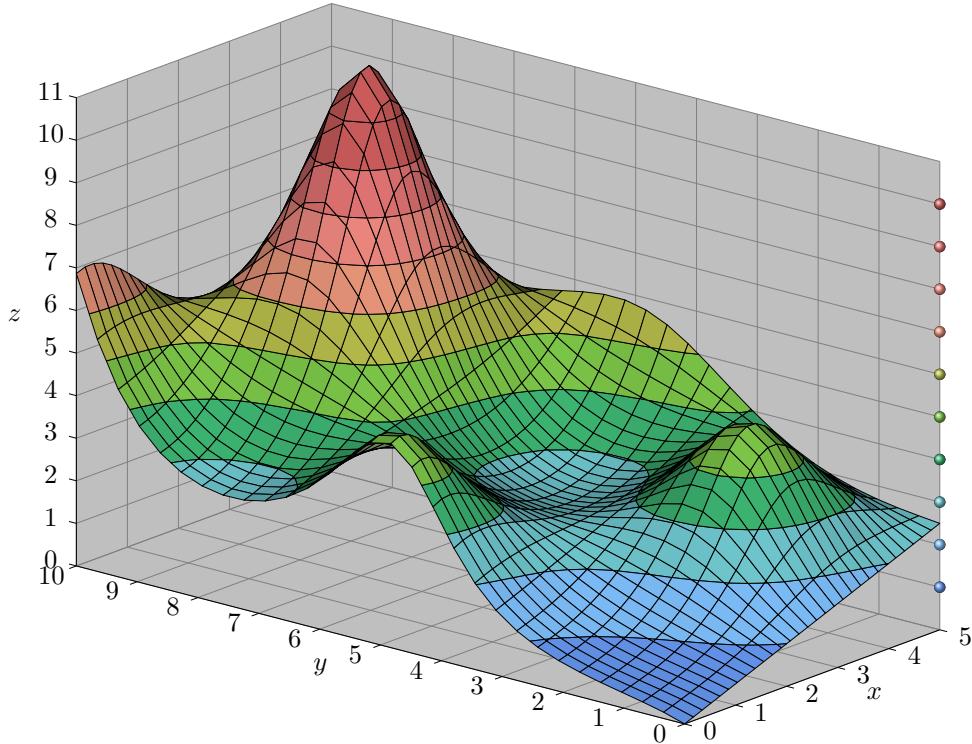
¹The name comes from “*C · esthetic P · roducts for R · epresenting I · nformative S · cientific M · aps*”. This name is a double play on words: [1] a prism splits light into an informative spectrum, symbolizing how data are decomposed into meaningful color, and [2] "@" read as "at" indicates where the light meets the prism to be broken down into an informative spectrum.

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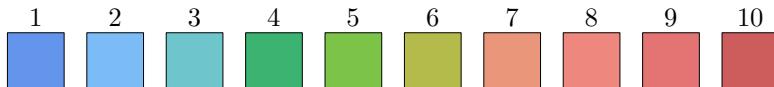
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I. Motivations

Originally, this project was born out of a desire to enhance `luadraw` with a set of color palettes to easily produce something like the following 3D plot.



Technically, a finite list of colors is provided to `luadraw` which then uses linear interpolation to calculate the intermediate colors. In the previous case, the finite color palette used is defined as follows.

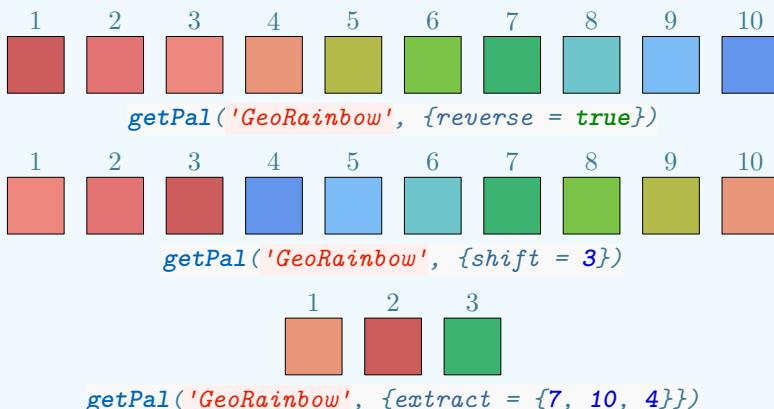


Using this palette, `luadraw` is able to produce the following spectrum, allowing us to create the graph above.

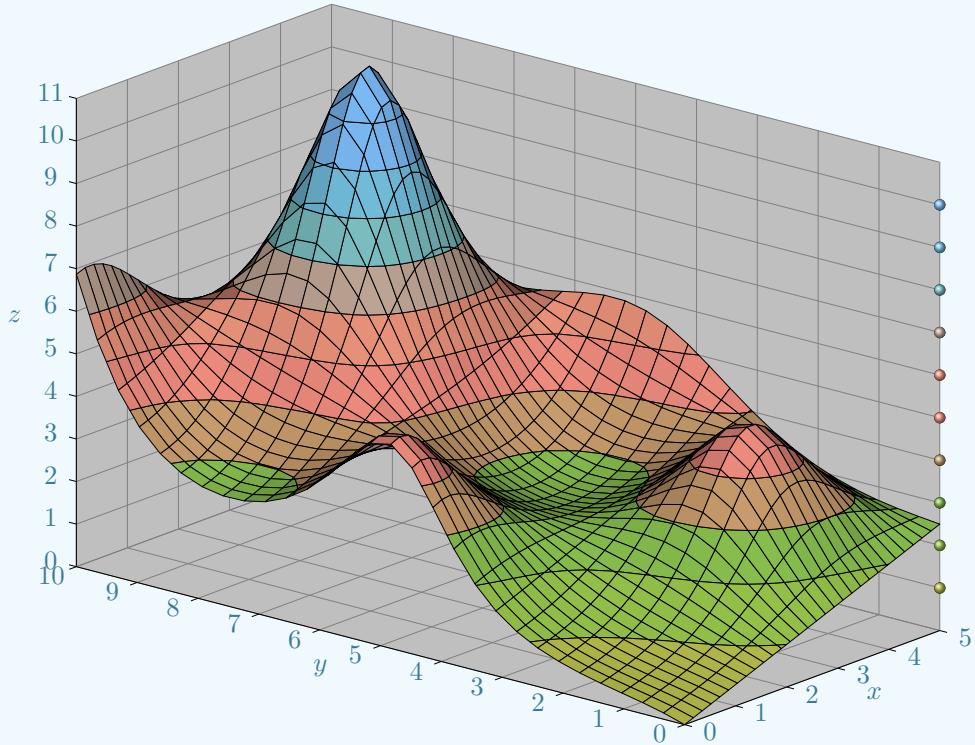


Note.

Using the `luadraw` implementation of `@prism`, see the section V-2, we can create the palettes below made from the previous one named '`'GeoRainbow'`'. Each instruction used is given below each palette.



This features provide remarkable creative flexibility: with the same surface as before, but using the setting `getPal('GeoRainbow', {extract = {2, 3, 7, 8, 5, 6}, reverse = true})` instead of `getPal('GeoRainbow')`, we instantly change the visual tone, shifting from a seaside feel to a snow-covered world.



II. Where do the color palettes come from?

Most color palettes are obtained from [Matplotlib](#) and [Scientific Colour Maps](#) by segmenting their color maps into 10 values.² We retain only palettes that comply with the following rules.

- **No repetition.** Some [Matplotlib](#) palettes are duplicated,³ in which case we keep the first one in lexicographical order.
- **No reversed versions.** Unlike [Matplotlib](#),⁴ `@prism` never includes reversed palettes as fixed data.

In addition to [Matplotlib](#) and [Scientific Colour Maps](#) palettes, `@prism` includes some original creations.

We list below the palettes ignored due to duplication.⁵ The symbol \equiv indicates equality, \rightleftharpoons indicates reversal, and the rightmost palette is the one retained in `@prism`.

• Matplotlib	GistGray \rightleftharpoons Binary
	GistGrey \rightleftharpoons Binary
	GistYarg $=$ Binary
	GistYerg $=$ Binary
	Gray \rightleftharpoons Binary
	Grey \rightleftharpoons Binary
	Greys $=$ Grays

Note.

Adding new palettes to `@prism` is straightforward (no coding skills required). See section VI-2 to get started.

²[Asymptote](#) is also used, but currently offers nothing beyond [Matplotlib](#), despite different implementations.

³Likely for historical reasons.

⁴Most [Matplotlib](#) color maps have a reversed version named with the `_r` suffix, possibly for performance reasons.

⁵Recall that [Matplotlib](#) reversed color maps (with the `_r` suffix) are systematically excluded and therefore not shown here.

III. Reuse from...

1. Matplotlib

Here are the key points to remember when using palettes similar to those offered by [Matplotlib](#).

1. `@prism` uses standardized CamelCase notation. Therefore, `Matplotlib` palette names such as `berlin` and `gist_heat` become `Berlin` and `GistHeat` respectively.
2. Palettes with a name ending with the `_r` suffix (reversed color order) are not included in `@prism`. However, the `@prism` implementations provide methods to easily obtain reversed palettes, sub-palettes, and color-shifted palettes.

2. Asymptote and Scientific Colour Maps

Simply apply the naming standardization explained in the previous section (see point 1).

IV. How to choose a palette?

Two methods are available to find the ideal palette.

1. The documents `showcase-en-std.pdf` (light theme) and `showcase-en-dark.pdf` (dark theme) present use cases for each palette.
2. Appendix 1 page 10 presents all palettes organized by theme with a visualization of their color spectrum.

 Note.

Appendix 2 page 19 groups visually similar palettes together.

V. Supported implementations

The implementations are inside the folder `products`.

1. JSON, the versatile default format

By default, a file `palettes.json` is provided to allow unsupported coding languages to also integrate `@prism` palettes. Here are the first line of this file.

```
{  
  "Accent": [  
    [0.498039, 0.788235, 0.498039],  
    [0.690196, 0.705881, 0.757298],  
    [0.882352, 0.721568, 0.661437],  
    [0.99477, 0.835294, 0.550326],  
    [0.913289, 0.935947, 0.610021],  
    [0.306317, 0.487581, 0.680174],  
    [0.700653, 0.146404, 0.562091],  
    [0.855772, 0.162962, 0.316775],  
    [0.671459, 0.366448, 0.159041],  
    [0.4, 0.4, 0.4]  
  ],  
  ...  
}
```

2. luadraw palettes

a. Description

You can use `@prism` palettes with `luadraw` which is a package that greatly facilitates the creation of high-quality 2D and 3D plots via `LuaLaTeX` and `TikZ`.

Note.

Initially, the `@prism` project was created to provide ready-to-use palettes for `luadraw`.

b. Use a luadraw palette

The `Lua` palette names all use the prefix `pal` followed by the name available in the file `palettes.json`. You can access a palette by three ways.

- `palGistHeat` is a `Lua` variable.
- `getPal('GistHeat')` and `getPal('palGistHeat')` are equal to `palGistHeat`.
- `palNames['palGistHeat']` is equal to `palGistHeat`.

Note.

The `Lua` palette variables are arrays of arrays of three floats. Here is the definition of `palGistHeat`.

```
palGistHeat = {  
    {0.0, 0.0, 0.0},  
    {0.105882, 0.0, 0.0},  
    {0.211764, 0.0, 0.0},  
    {0.317647, 0.0, 0.0},  
    {0.429411, 0.0, 0.0},  
    {0.535294, 0.0, 0.0},  
    {0.641176, 0.0, 0.0},  
    {0.752941, 0.003921, 0.0},  
    {0.858823, 0.145098, 0.0},  
    {0.964705, 0.286274, 0.0},  
    {1.0, 0.42745, 0.0},  
    {1.0, 0.57647, 0.152941},  
    {1.0, 0.717647, 0.435294},  
    {1.0, 0.858823, 0.717647},  
    {1.0, 1.0, 1.0}  
}
```

The `getPal` function has some options. To explain how this works, let's consider the following use case.

```
mypal = getPal(  
    'GistHeat',  
    {  
        extract = {2, 5, 8, 9},  
        shift   = 1,  
        reverse = true  
    }  
)
```

To simplify the explanations, we will refer to the colors in the standard palette '`GistHeat`' as `coul_1`, `coul_2`, etc. The options are then **processed in the following order**.

1. `{coul_2, coul_5, coul_8, coul_9}` is the result of the extraction.
2. `{coul_9, coul_2, coul_5, coul_8}` comes from the shifting applied to the extracted palette (colors move to the right if `shift` is positive).
3. `{coul_8, coul_5, coul_2, coul_9}` is the reversed version of the shifted palette.

Note.

The reversed version of any palette can be obtained using `getPal(palname, {reverse = true})`.

VI. Contribute via Git

⚠ Caution.

Never use the `main` branch, which is for freezing the latest stable versions of all the projects in the mono repository <https://github.com/projetmbc/for-writing>.

1. Complete the translations

💡 Important.

Although we're going to explain how to translate the documentation, it doesn't seem relevant to do so, as English should suffice these days.

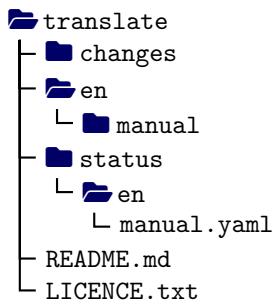


Figure 1: Simplified view of the translation folder

The translations are roughly organized as in figure 1 where just the important folders for the translations have been “opened”.⁶ A little further down, the section VI-1-e explains how to add new translations.

a. The `en` folder

This folder, managed by the author of `@prism`, contains files easy to translate even if you're not a coder.

b. The `changes` folder

This folder is a communication tool where important changes are indicated without dwelling on minor modifications specific to one or more translations.

c. The `status` folder

This folder is used to keep track of translations from the project's point of view. Everything is done via well-commented YAML files, readable by a non-coder.

d. The `README.md` and `LICENCE.txt` files

The `LICENCE.txt` file is aptly named, while the `README.md` file takes up in English the important points of what is said in this section about new translations.

e. New translations

ℹ Note.

The folder `manual` is reserved for documentation. It contains `TEX` files that can be compiled directly for real-time validation of translations.

💀 Warning.

Only start from the `en` folder, as it's the responsibility of the `@prism` author.

⁶This was the organization on October 26, 2025.

*Let's say you want to add support for Italian.*⁷ To do this, you must use **Git** as follows.

1. Via <https://github.com/projetmbc/for-writing/tree/aprism/@prism>, recover the entire project folder. Do not use the `main` branch, which is used to freeze the latest stable versions of all the projects in the mono repository <https://github.com/projetmbc/for-writing>.
2. In the `@prism/contrib/translate` folder, create an `it` copy of the `en` folder, where `it` is the short name of the language documented in the page "*IETF language tag*" from Wikipedia.
3. Once the translation is complete in the `it` folder, share it via <https://github.com/projetmbc/for-writing/tree/aprism/@prism> using a classic `git push`.

2. Improving the source code

Participation as a coder is made via the repository <https://github.com/projetmbc/for-writing/tree/aprism/@prism> corresponding to the `@prism` development branch. Here is what you can do, details can be found in the file <https://github.com/projetmbc/for-writing/blob/aprism/@prism/contrib/products/README.md>.

1. Create new palettes within an existing implementation. No coding skills required.
2. Propose a new implementation in your favorite programming language.
3. Combine both approaches.

VII. History

1.2.1 Fix.

- Equal palettes: the floating point equality uses now a correct tolerance.

1.2.1 Break.

- Palettes: the extra `Greys` has been removed (it is equal to `Grays`).

1.2.1 New.

- Similar palettes: two PDF files show similar palettes in standard and black modes (semi-automated process used).

1.2.1 Update.

- `luadraw` product: the associative array `palNames` has been added for compatibility reasons with the `luadraw` package.
- `BlindFish` palette: the last color variation has been made smoother (`luadraw` process used).

1.2.0 Break.

- Palettes: all final palettes now consist of 10 colors.
- `luadraw` products: the `getPal` dictionary array has been converted into a function accepting string palette names (with or without `pal` prefix). See below.

1.2.0 New.

- Palettes.
 - Added `Lemon` and `ShiftRainbow` palettes (`luadraw` creation process used).
 - Added 37 palettes from the `Scientific Colour Maps` project.
- `luadraw` product: accessing a palette and creating new ones can be made using the `getPal` function which has an optional argument `options` (dict-like array) with the following keys and their values.
 - `extract`: a list of non-zero integers used to extract specific colors from the palette (the order is preserved).
 - `reverse`: a boolean value indicating whether to reverse the palette color order (`false` by default).
 - `shift`: an integer value for applying a circular color shift to the palette.
- Documentations
 - Added English PDF manual.
 - Showcase: two PDF files demonstrate the use of each palette (white and dark modes).

⁷As mentioned above, there is no real need for the `doc` folder.

⚠ Break.

- Duplicate palettes and those that are reverse of others are ignored (strict equalities only).

⚠ New.

- New palettes added: `BurningGrass`, `GeoRainbow` and `PastelRainbow` (`luadraw` creation process used).
- The `luadraw` palette product has a new dictionary like variable `getPal` to access a palette using its name (as a string variable).

⟳ Update.

- Palette contributions: in the mandatory `extend.py` file, the `build_code` function must work with the dictionary of all the palettes, and manage a credit to the `@prism` project.

⚡ First public version of the project.

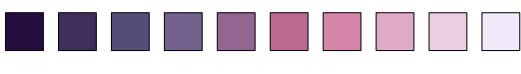
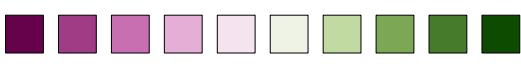
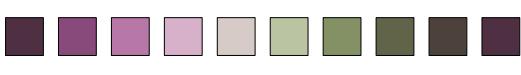
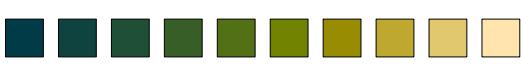
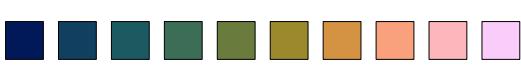
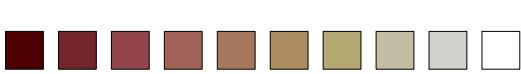
Appendix 1 – The 127 palettes at a glance

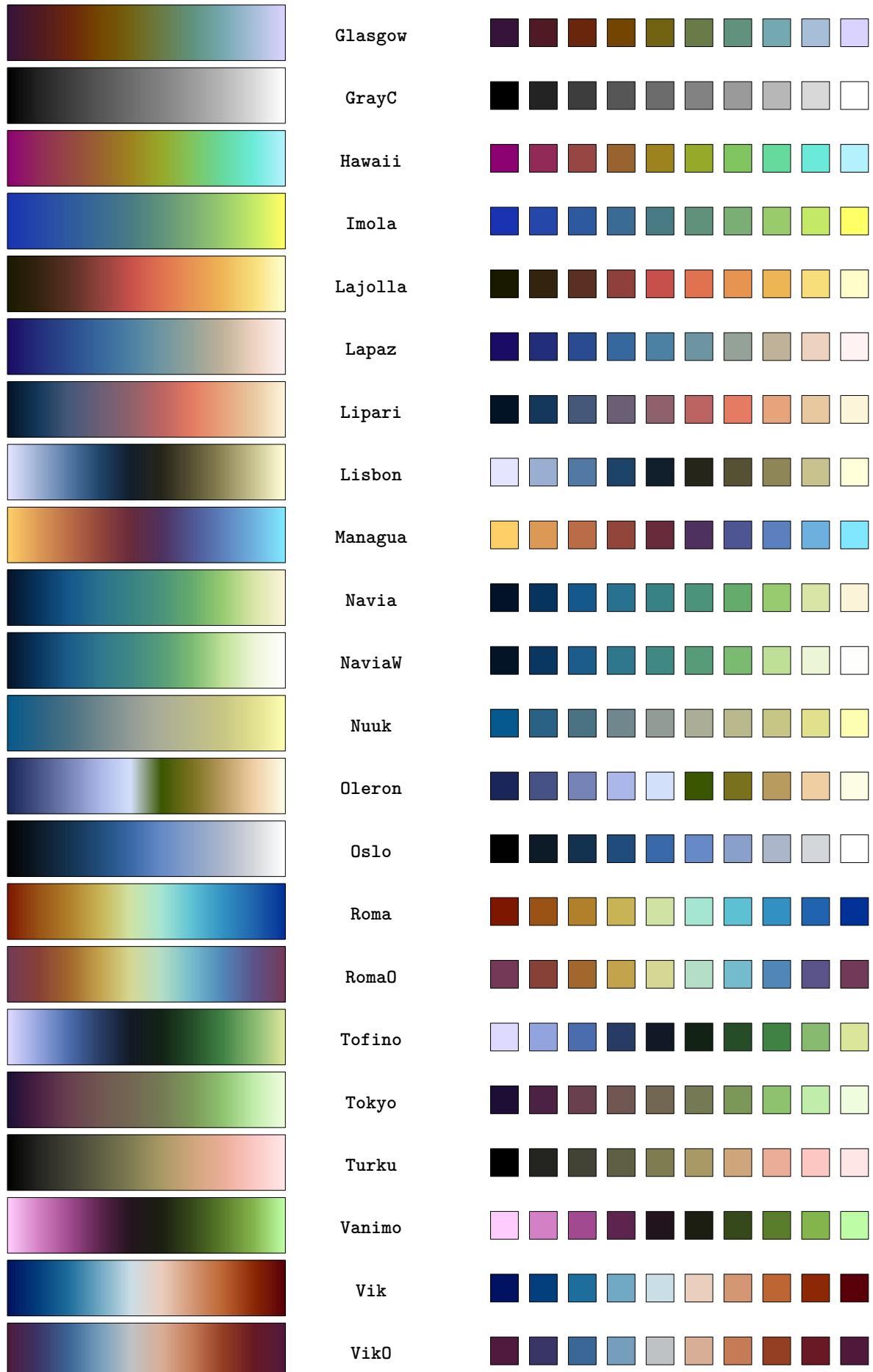
The palette names used in this appendix are standard. Depending on the chosen implementation, they may be prefixed.

Important.

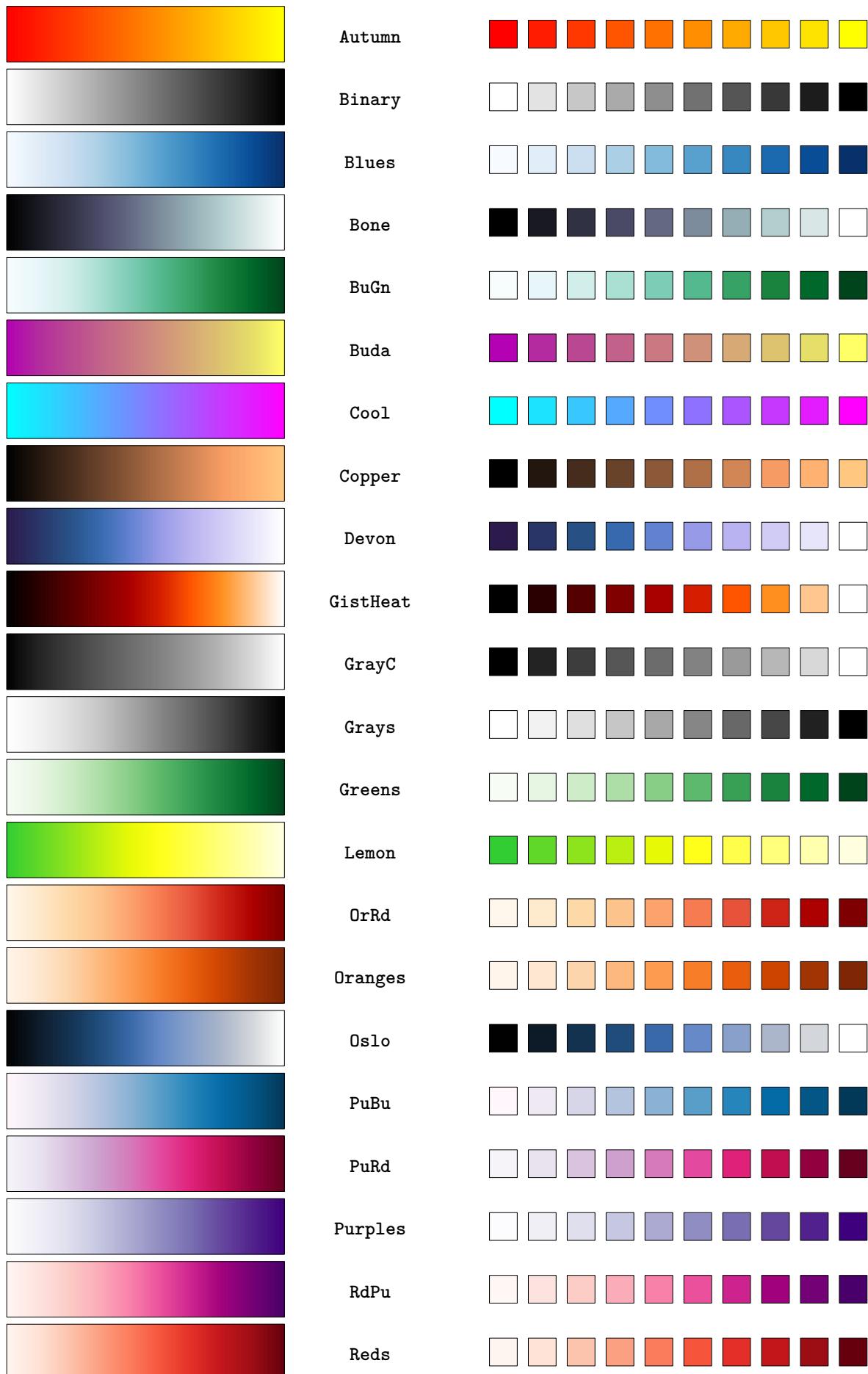
Categories were generated semi-automatically using a program, followed by manual selection to obtain relevant choices. If you identify any errors, please contact the author of `@prism`.

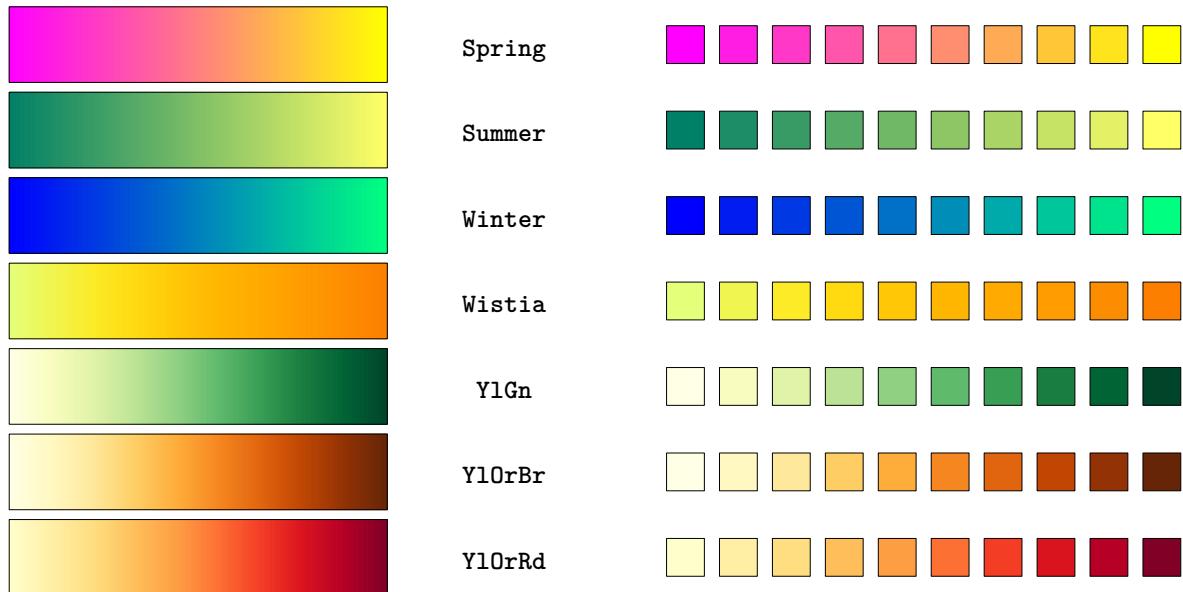
Colorblind-friendly palettes (coming from Scientific Colour Maps) – 40 palettes

	Acton	
	Bam	
	Bam0	
	Bamako	
	Batlow	
	BatlowK	
	BatlowW	
	Berlin	
	Bilbao	
	Broc	
	Broc0	
	Buda	
	Bukavu	
	Cork	
	Cork0	
	Davos	
	Devon	
	Fes	

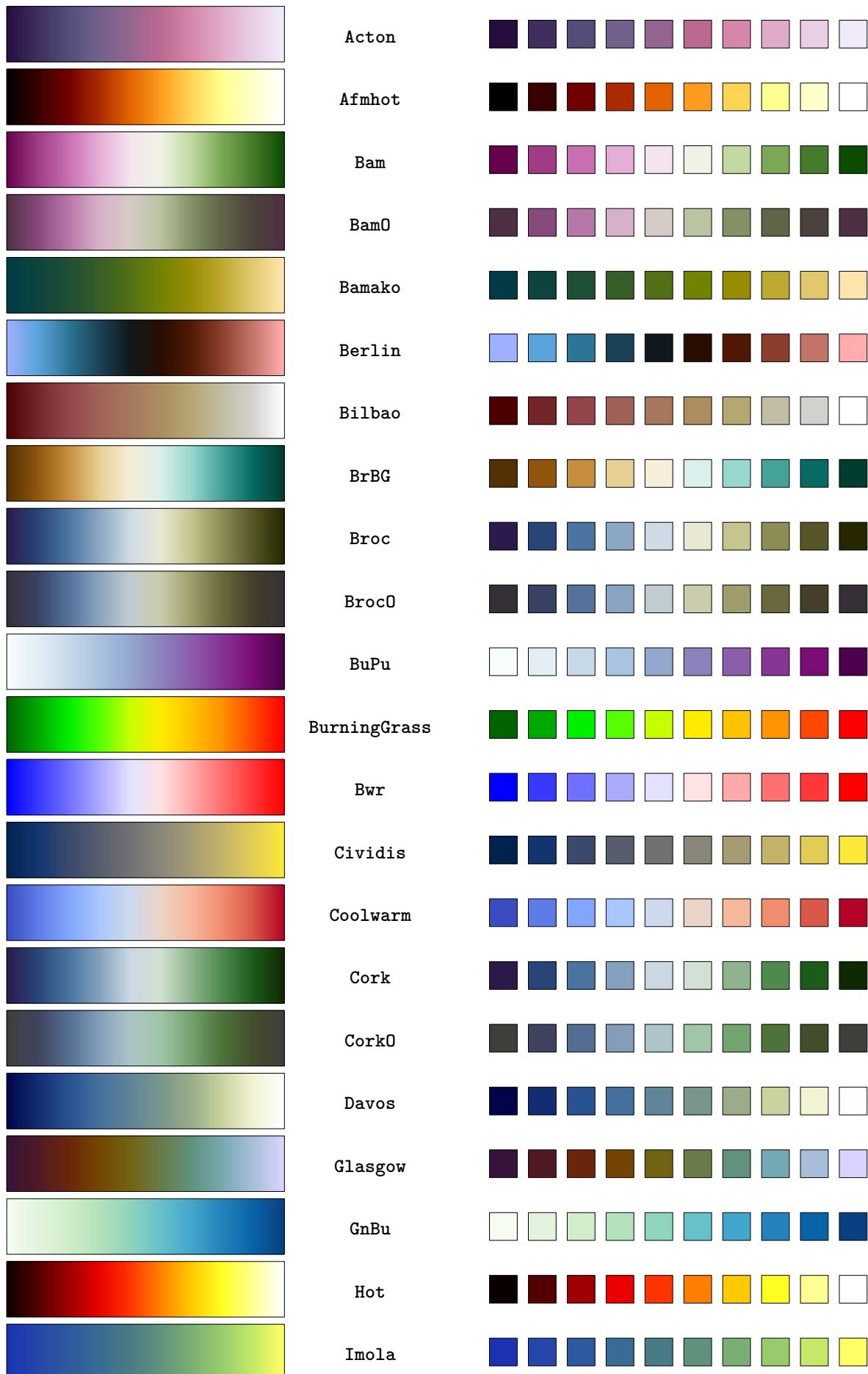


Two-color palettes – 29 palettes



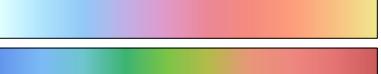
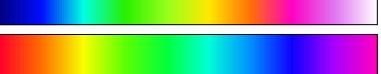


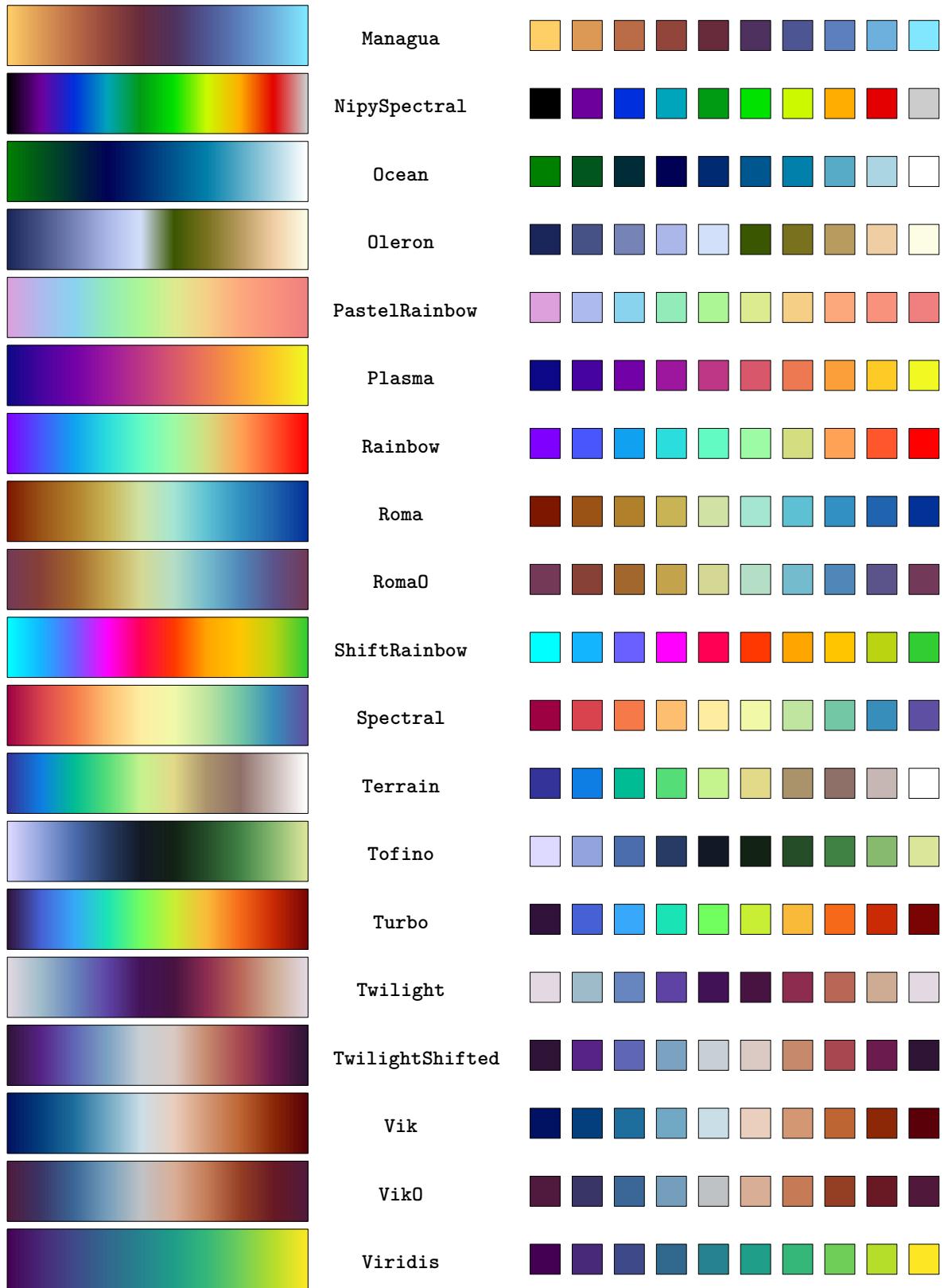
Three-color palettes – 41 palettes



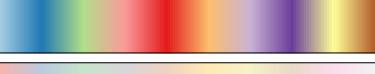
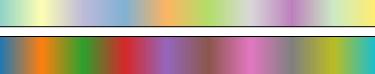


Rainbow-style palettes – 41 palettes

	Batlow	
	BatlowK	
	BatlowW	
	BlindFish	
	Brg	
	Bukavu	
	CMRmap	
	Cubehelix	
	GasFlame	
	GeoRainbow	
	GistEarth	
	GistNcar	
	GistRainbow	
	Gnuplot	
	Gnuplot2	
	Hawaii	
	Hsv	
	Inferno	
	Jet	
	Lipari	
	Lisbon	
	Magma	



High-contrast palettes – 16 palettes

	Accent	
	Dark2	
	Fes	
	Flag	
	GistStern	
	Paired	
	Pastel1	
	Pastel2	
	Prism	
	Set1	
	Set2	
	Set3	
	Tab10	
	Tab20	
	Tab20b	
	Tab20c	

Appendix 2 – Similar palettes

This appendix contains visually similar color palettes. While the differences between some are minimal, we have retained them to respect individual preferences.

Important.

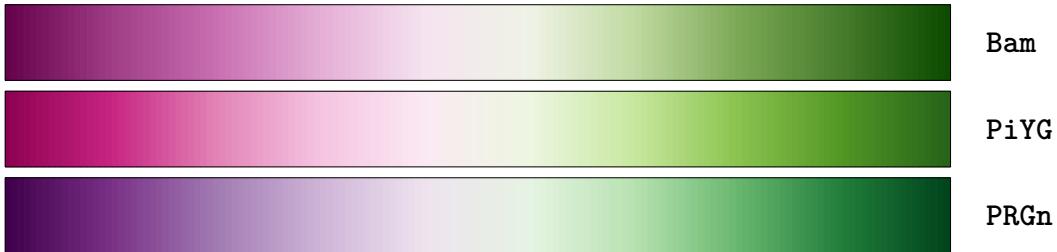
Clusters were generated semi-automatically using a program that suggests similar palettes, followed by manual curation to retain only relevant groupings.^a This approach may occasionally miss some similarities. If you identify any omissions, please contact the author of `@prism`.

^aThe palettes are analyzed in both light and dark modes.

Cluster #1



Cluster #2



Cluster #3



Cluster #4



Cluster #5



Cluster #6



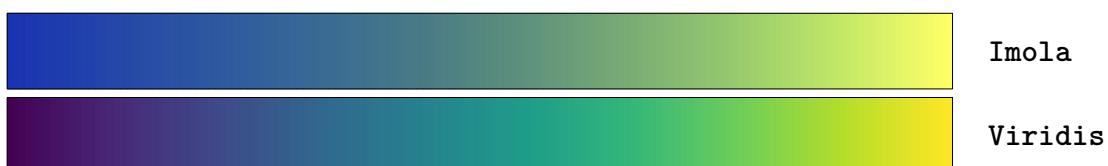
Cluster #7



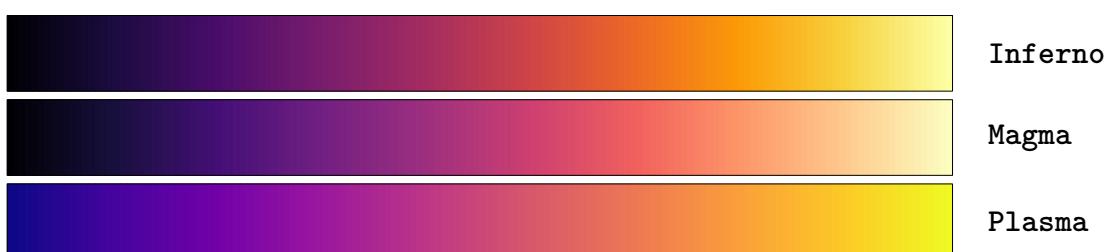
Cluster #8



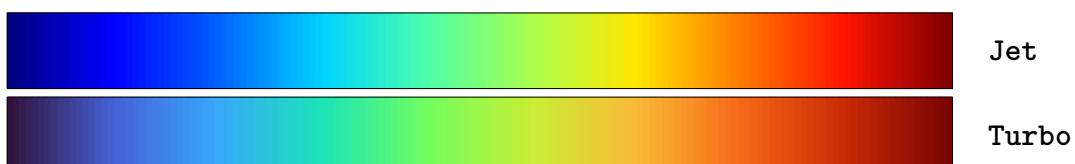
Cluster #9



Cluster #10



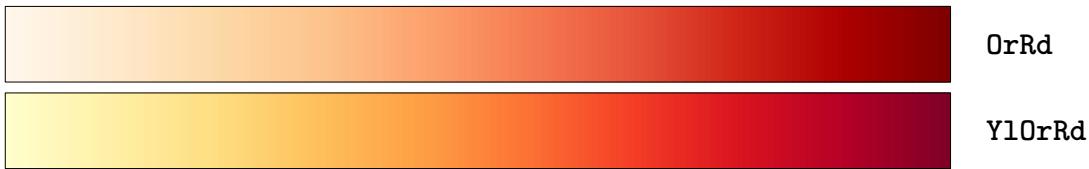
Cluster #11



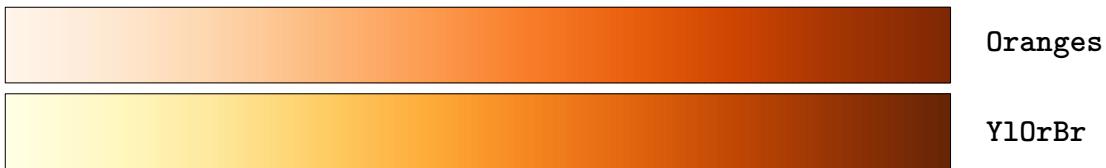
Cluster #12



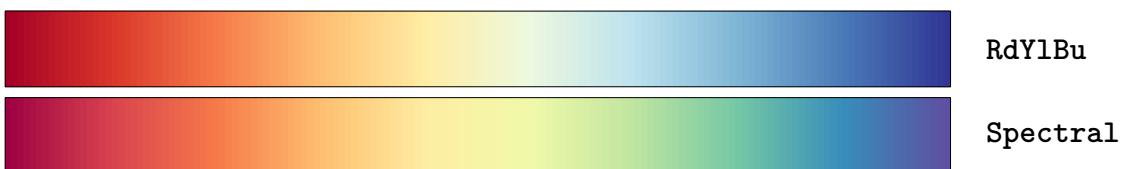
Cluster #13



Cluster #14



Cluster #15



Cluster #16

