

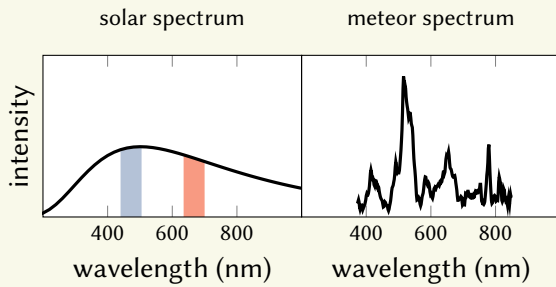
# Does a meteor's "color" reflect its composition?

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## Background

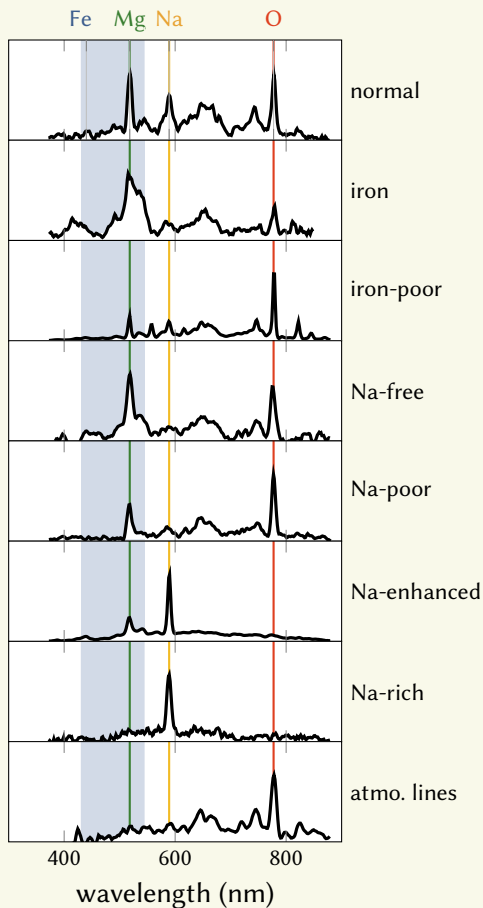
Astronomers sometimes use color – the relative brightness of an object seen through two different color filter – as a proxy for other quantities. For instance, a star's color indicates its temperature because stellar spectra vary in a predictable way.

Meteor spectra are dominated by emission lines and reducing them to a "color" is not as straightforward. **We combine meteor spectra from the literature with standard Bessel filter functions to test whether color measurements can probe a meteor's spectral type.**



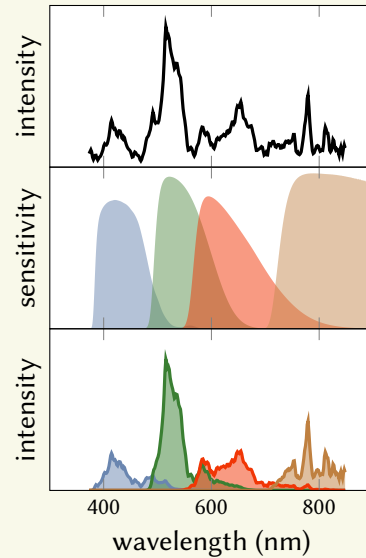
## The Vojáček et al. (2015) catalog of meteor spectra

Vojáček et al. (2015) present a catalog of 84 meteor spectra. These meteors are classified based on the strength of their emission lines using the Borovička et al. (2005) approach:



## Basic approach

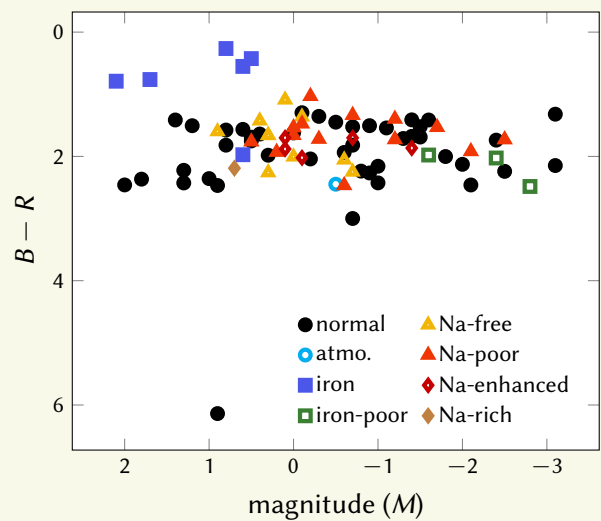
We simulate the "color" of meteors by filtering the Vojáček spectra through standard B, V, R, and I Bessel filter functions:



We then integrate the area under each curve and convert to magnitude in order to obtain the color values shown below.

## Results

**Most categories are indistinguishable by color. Only iron types stand out by being bluer/less red than other meteors.**



Distinguishing spectral categories in most cases would require a full spectrum or line-specific filters.

## References

Borovička, J. et al., 2005, *Icarus*, 174, 15-30.  
Vojáček, V. et al., 2015, *A&A*, 580, A67.