

# LEBANON CAMERA CLUB

## Lens Filters

1/8/2019

# Lens Filters

---

## Types

- UV
- Neutral density
- Tone modification (B&W)
- Color correction
- Polarizing
- Special effects

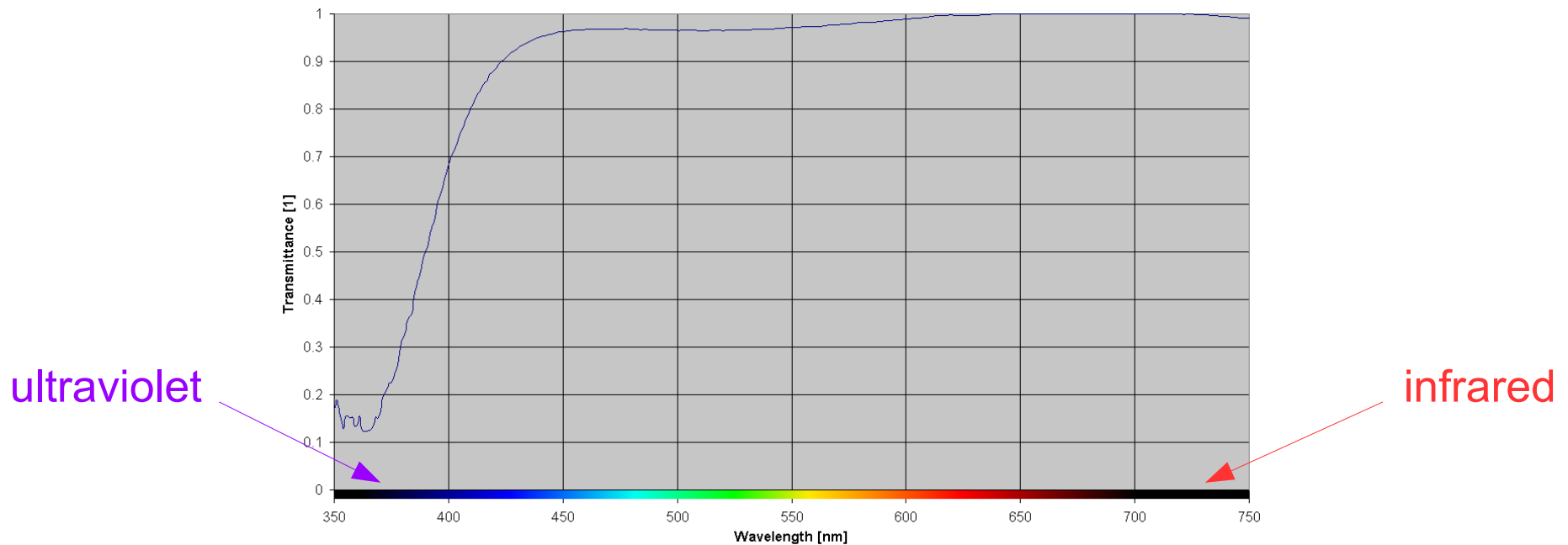
# Lens Filters

## UV

- Blocks ultraviolet light
  - ◆ Causes fogging/haze
- Different amount of blocking
  - ◆ Haze filter → stronger UV reduction



UV filter



# Lens Filters

---

## UV

- Blocks ultraviolet light
  - ◆ Causes fogging/haze
- Different amount of blocking
  - ◆ Haze filter → stronger UV reduction
- Often used to protect lens
  - ◆ Useful in 'dangerous environments'
  - ◆ Anything put into the optical path can affect image quality
    - Type/quality of material and coatings determine performance



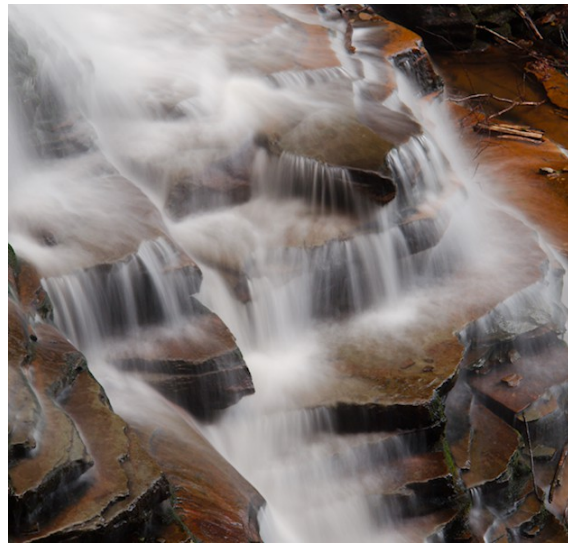
# Lens Filters

## Neutral density

- Blocks all wavelengths of light
  - ◆ Use: scene too bright for desired aperture
  - ◆ Use: long exposures
    - Intentional blur → waterfalls, motion effects, 'ghost' effects



1/60 sec shutter speed



2.5 sec shutter speed



# Lens Filters

## Neutral density

- Blocks all wavelengths of light
  - ◆ Use: scene too bright for desired aperture
  - ◆ Use: long exposures
    - Intentional blur → waterfalls, motion effects, 'ghost' effects
- Filter factor
  - ◆ Amount of light blocked by the filter
    - Measured in stops, optical density number, or filter factor number



Stops	Optical Density #	Filter Factor #	Light Reduction
0	0.0	0	0
1	0.3	2	1/2
2	0.6	4	1/4
3	0.9	8	1/8
6	1.8	64	1/64
10	3.0	1024	1/1024

# Lens Filters

---

## Neutral density

- **Blocks all wavelengths of light**
  - ◆ Use: scene too bright
  - ◆ Use: reduce shutter speed
    - Intentional blur → waterfalls, motion effects, 'ghost' effects
- **Filter factor**
  - ◆ Amount of light blocked by the filter
    - Measured in stops, optical density number, or filter factor number
- **Graduated neutral density**
  - ◆ Transitions from clear to ND value
    - Use: selective darkening in scene (usually the sky)
    - Transitions can be hard (abrupt) or soft (gradual)
  - ◆ Normally rectangular so transition zone can be moved
    - Requires a special filter holder that is attached to the lens



# Lens Filters

---

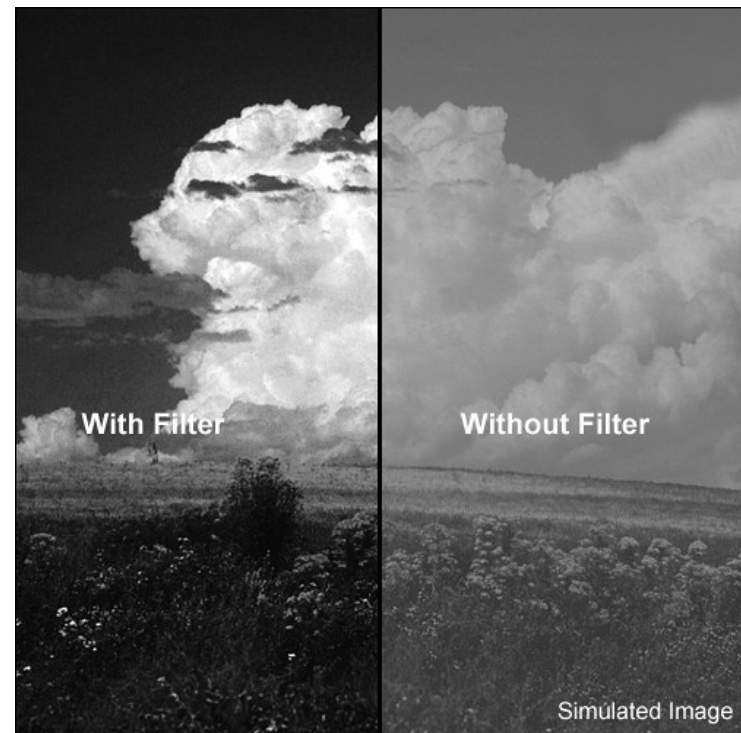
## Tone modification (B&W)

Note: Filters often described by “Wratten numbers” → #29 is a deep red

- Uniform filter used to block/enhance specific colors
  - ◆ Use: yellow, orange, red filter to darken sky for B+W film
    - Contrast increase → objects that do not contain filter color are dark
    - Common for landscape photographers like Ansel Adams



#29 filter





# Lens Filters

---

## Color correction

- Adjust white balance

- ◆ Use: adjust for daylight or tungsten film

- Common for slide film, where WB could not be adjusted later
- #80A → daylight film in tungsten light
- #85B → tungsten film in daylight

Note: Daylight color temperature is 5500K,  
tungsten color temperature is 3200K  
(more red, blue filter compensates)



# Lens Filters

---

## Color correction

- Adjust white balance
  - ◆ Use: adjust for daylight or tungsten film
    - Common for slide film, where WB could not be adjusted later
    - 80A → daylight film in tungsten light
    - 85B → tungsten film in daylight
  - ◆ Skylight
    - A type of UV filter that also corrects for blue cast from the sky
    - Light magenta tint → 1B is stronger than 1A



# Lens Filters

---

## Color correction

- Adjust white balance
  - ◆ Use: adjust for daylight or tungsten film
    - Common for slide film, where WB could not be adjusted later
    - 80A → daylight film in tungsten light
    - 85B → tungsten film in daylight
  - ◆ Skylight
    - A type of UV filter that also corrects for blue cast from the sky
    - Light magenta tint → 1B is stronger than 1A
  - ◆ Intensifier/enhancer
    - Boosts reds and oranges
    - Often used for fall foliage

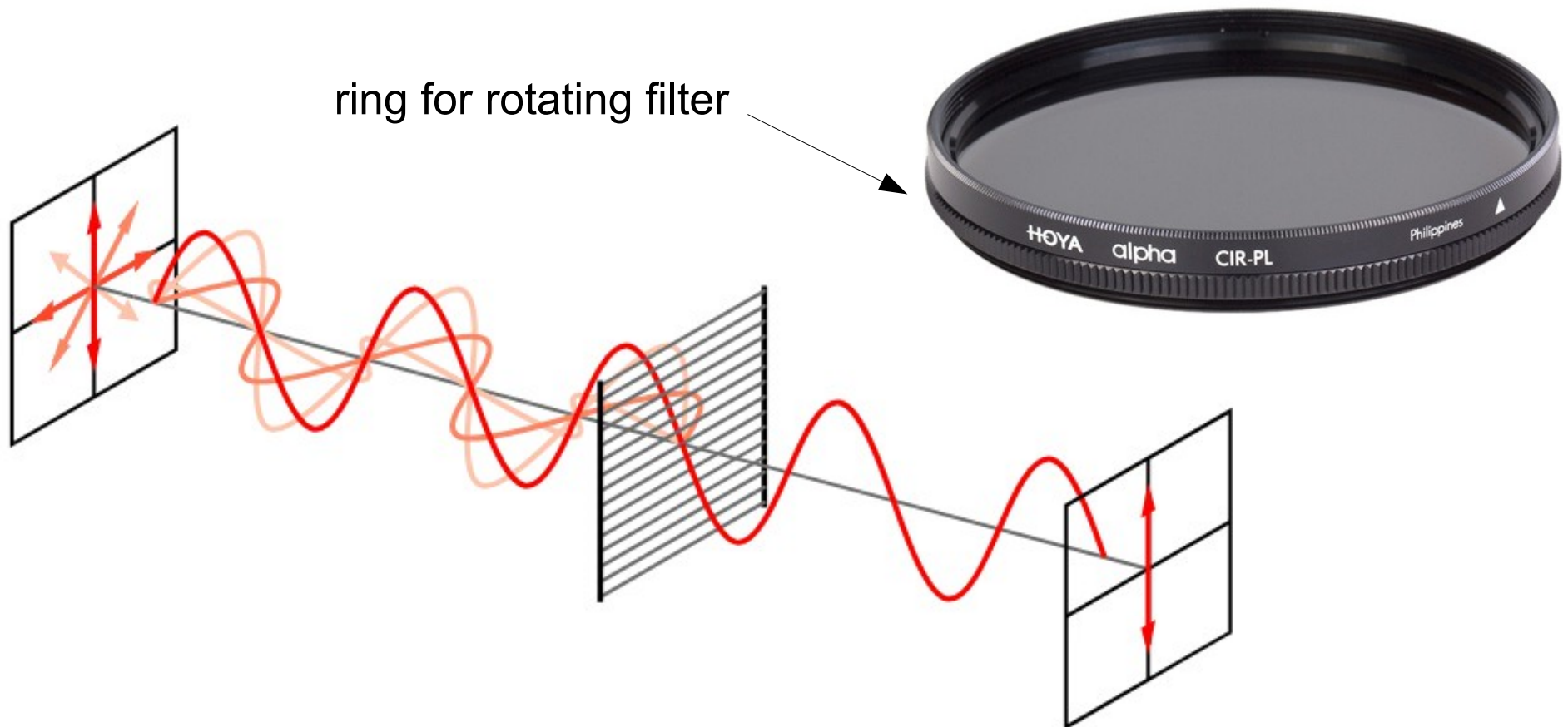


# Lens Filters

## Polarizing

Note: Polarizer filter factor is 1 to 1.5 stops, 1/2 to 1/3 the amount of light without the filter

- Passes light with a specific polarization
  - ◆ Light often has random polarization

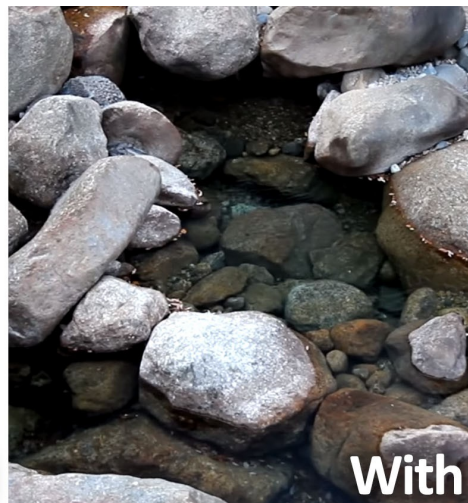
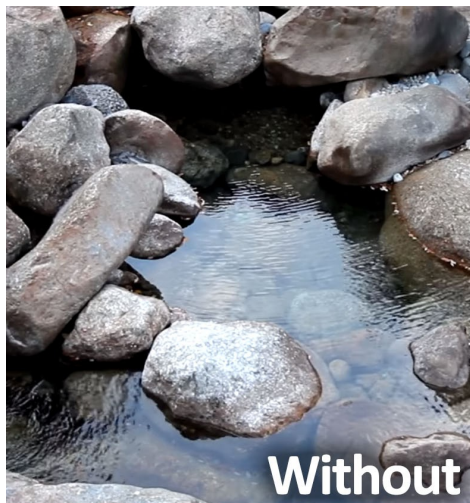


# Lens Filters

---

## Polarizing

- Passes light with a specific polarization
  - ◆ Light often has random polarization
  - ◆ Use: reduce intensity of reflections
    - Bright objects (chrome, glass), water
  - ◆ Use: darken sky
    - Be careful with wide angle lenses
    - Darkening can vary depending on sun/camera angle

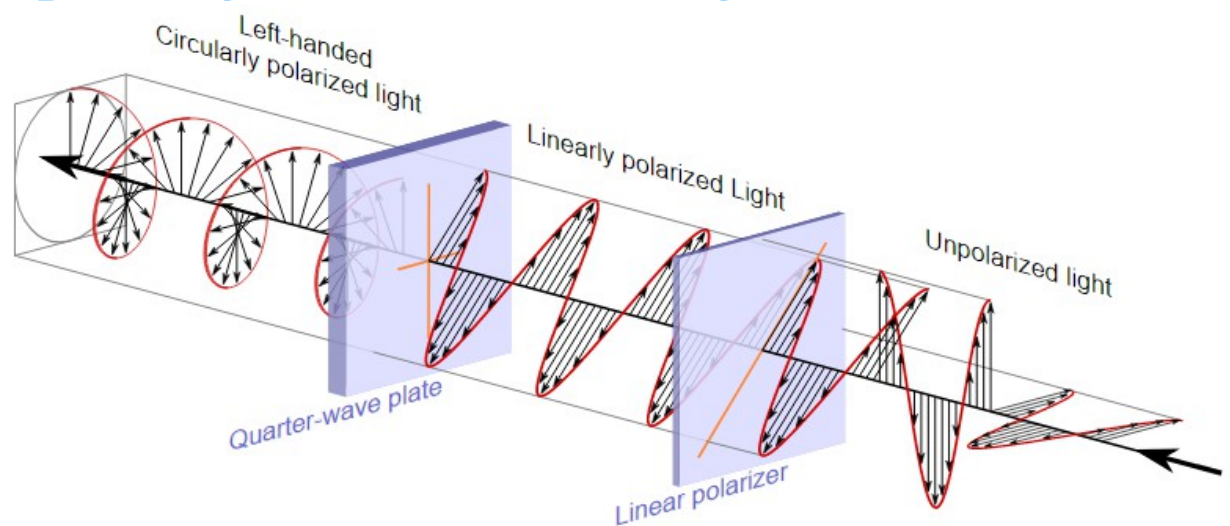


# Lens Filters

## Polarizing

Note: Linear polarizers affect modern autofocus and exposure systems → use circular polarizer

- Passes light with a specific polarization
  - ◆ Light often has random polarization
  - ◆ Use: reduce intensity of reflections
    - Bright objects (chrome, glass), water
  - ◆ Use: darken sky
    - Be careful with wide angle lenses
    - Darkening can vary depending on sun/camera angle
  - ◆ Types
    - Linear → older SLR
    - Circular → DSLR



# Lens Filters

## Special effects

- Examples
  - ◆ Star effect (cross screen)
  - ◆ Softening for portraits
  - ◆ Multi-image filter
    - Multiple copies of a portion of the image



# Lens Filters

---

## Filter materials & coatings

Note: Quality filter manufacturers are B+W, Cokin, Formatt, Heliopan, Hoya, Lee, Schneider, Singh-Ray, Tiffen → avoid cheap filters

- **Glass**
  - ◆ Best optical properties
    - Special glass (Schott) may have better performance (and cost more)
- **Plastic**
  - ◆ Inferior to glass, but less fragile
    - Often used for rectangular filters
- **Coatings**
  - ◆ Greatly affects light transmission and unwanted reflections
    - Multi-coating is superior to single coating
    - Different manufacturers coatings can vary in effectiveness
- **Thread size**
  - ◆ Expensive to buy filters for every lens diameter
    - Buy for largest lens, use step-up rings for smaller lens diameters



# Lens Filters

---

## Essential filters for digital cameras

- **UV** → only for protection
  - ◆ Digital cameras have UV blocking in the sensor
    - Might be useful at high altitude, where UV is stronger
- **Neutral density** → mainly for long exposures
- **Tone modification** → only for true B&W sensor
  - ◆ Color sensor tones can be adjusted in an image editor
- **Color correction** → not needed
  - ◆ Use custom white balance, or adjust in postprocessing
- **Polarizing** → cannot be duplicated in an editor
- **Special effects** → some can be done with an editor
  - ◆ Some digital cameras can do impressive effects in camera