MIT SAA

How to Use a dSLR

Monday, September 19, 2011

What is an SLR?

Single
Lens
Reflex

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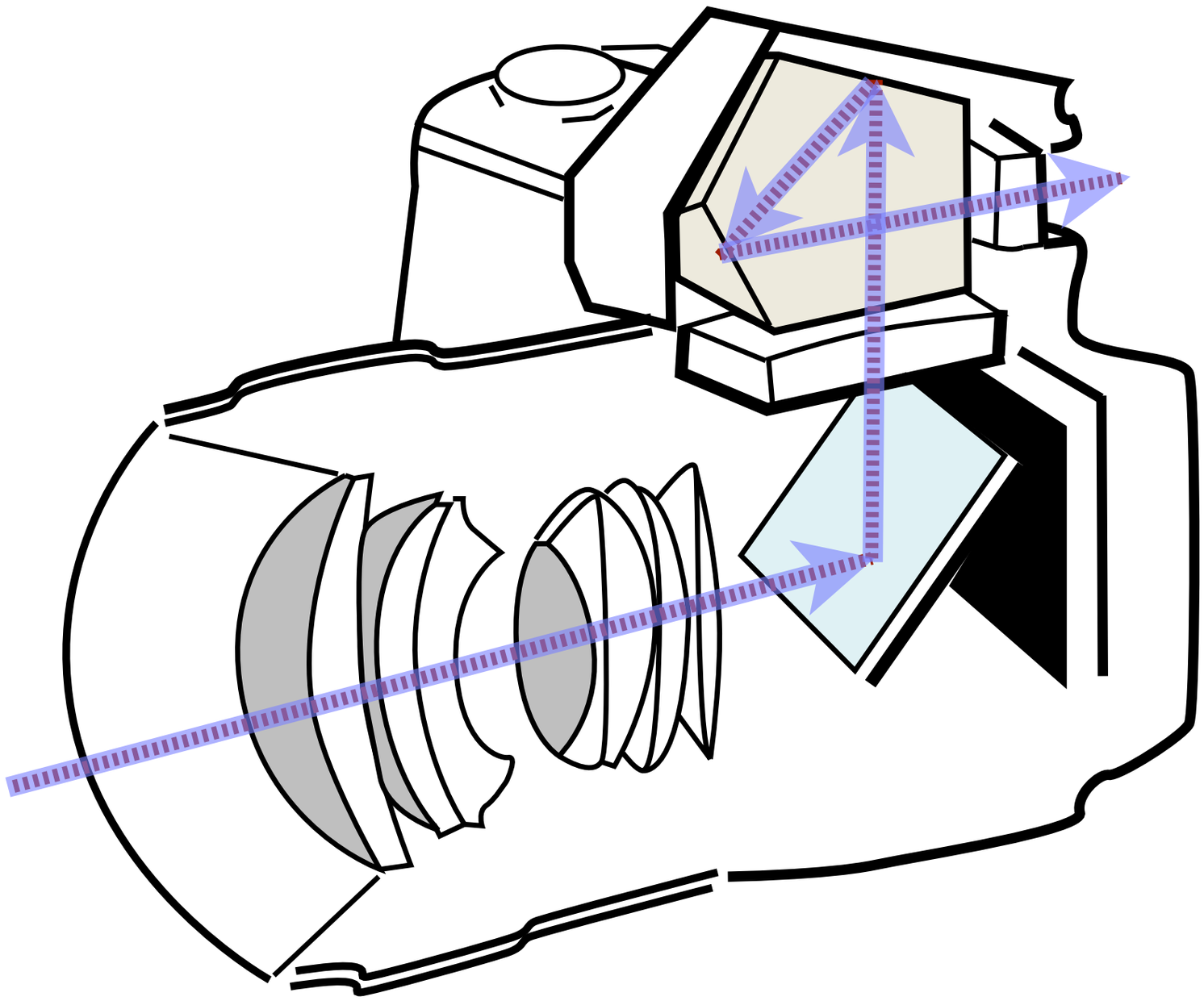
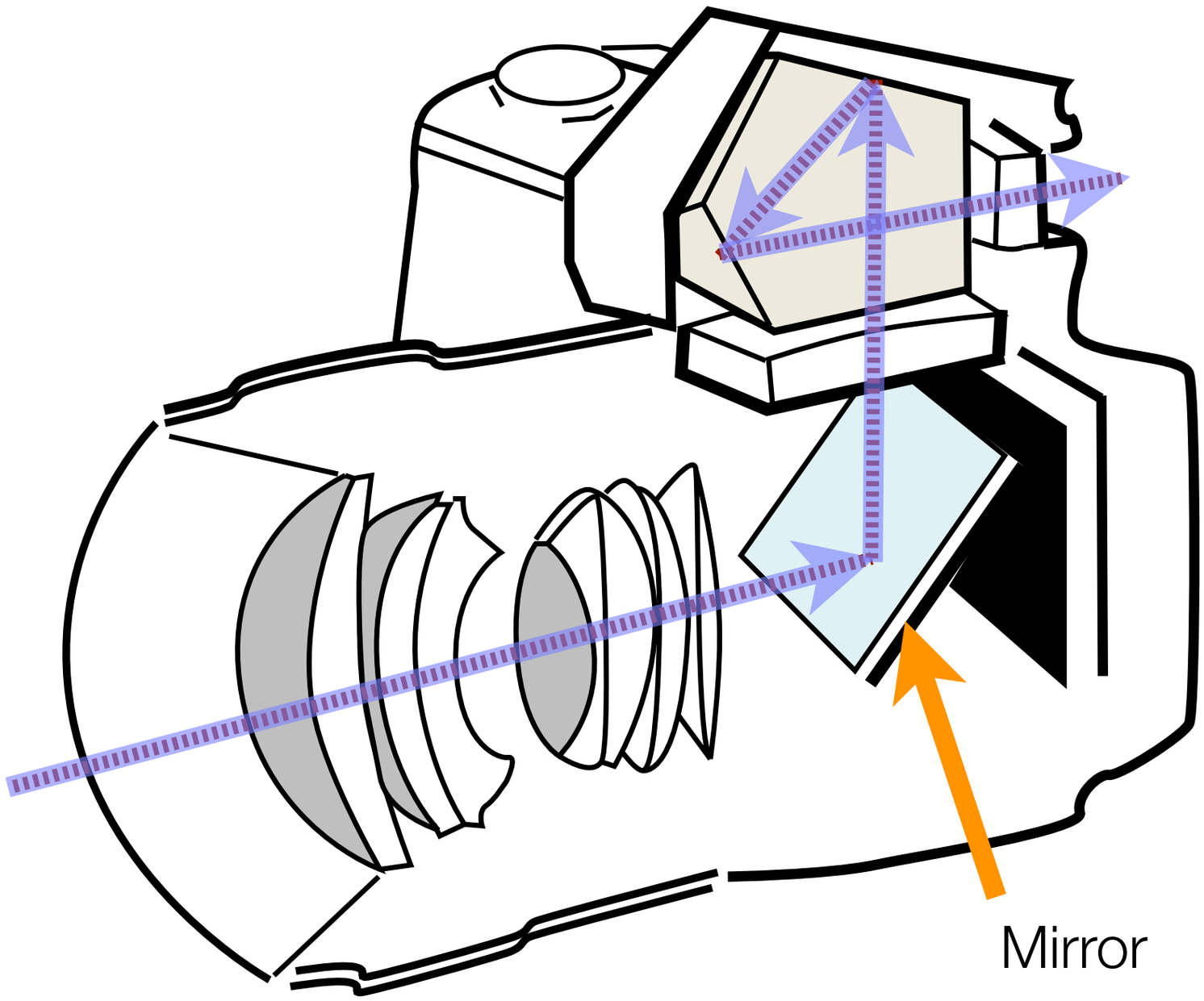
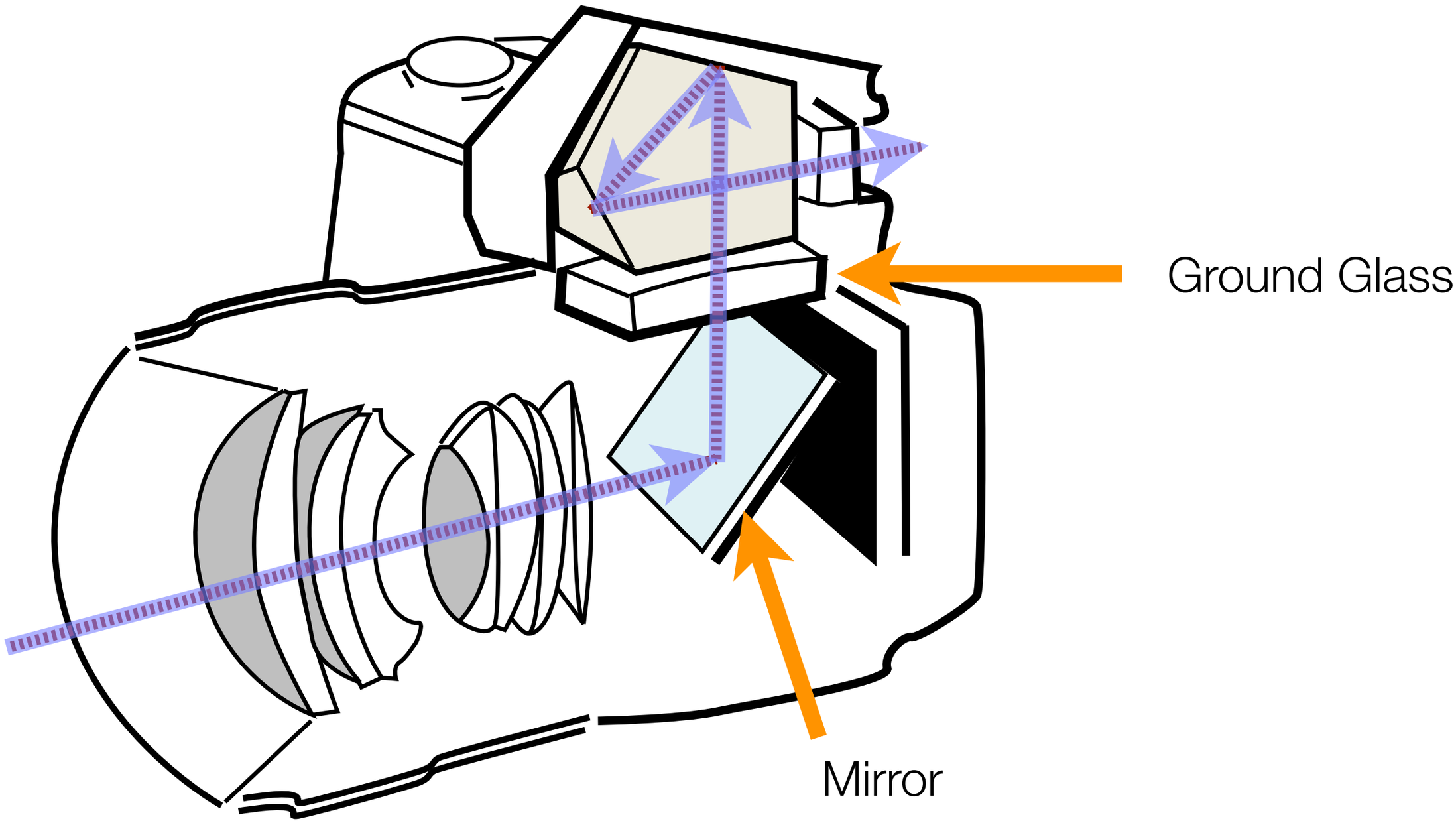
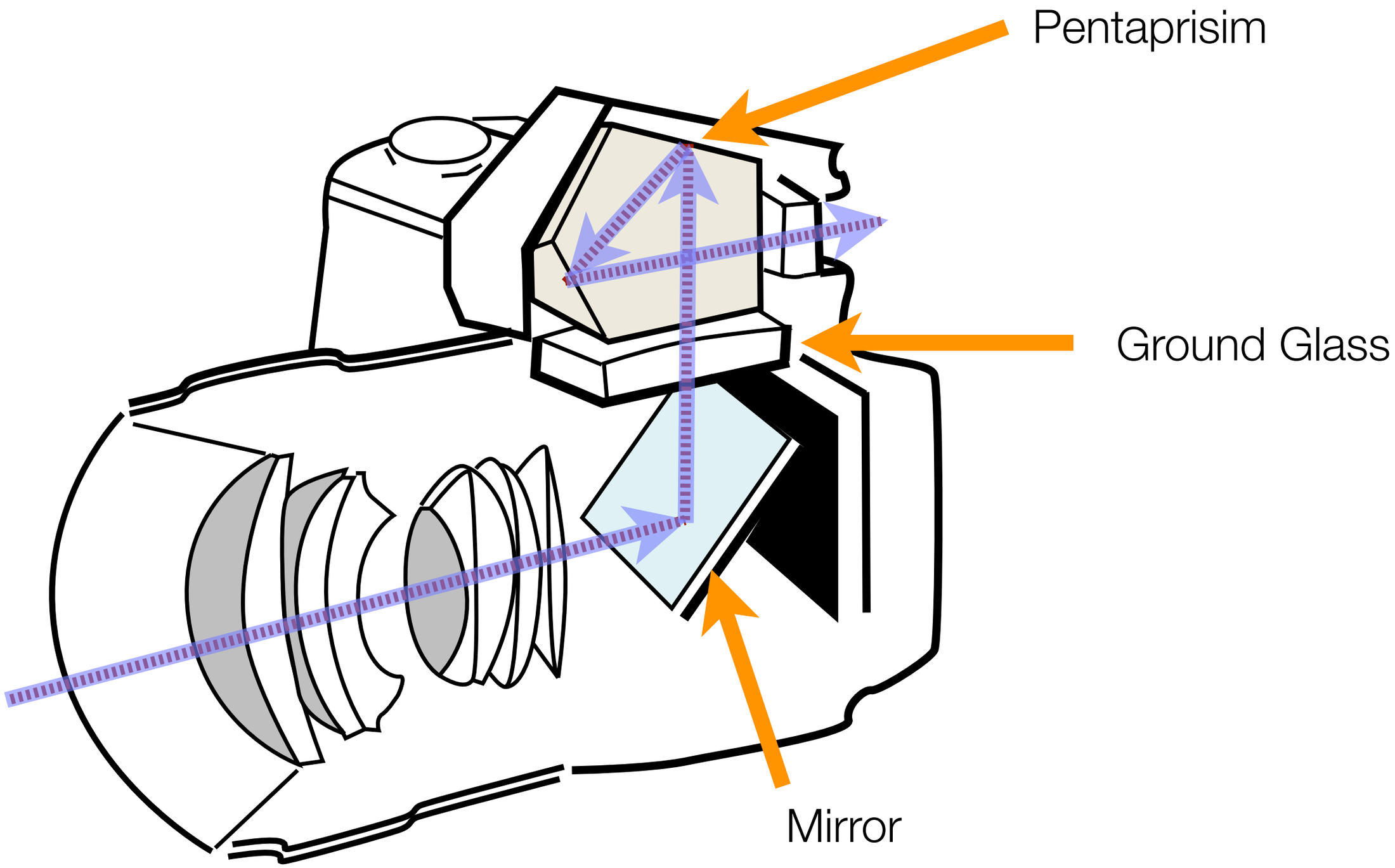
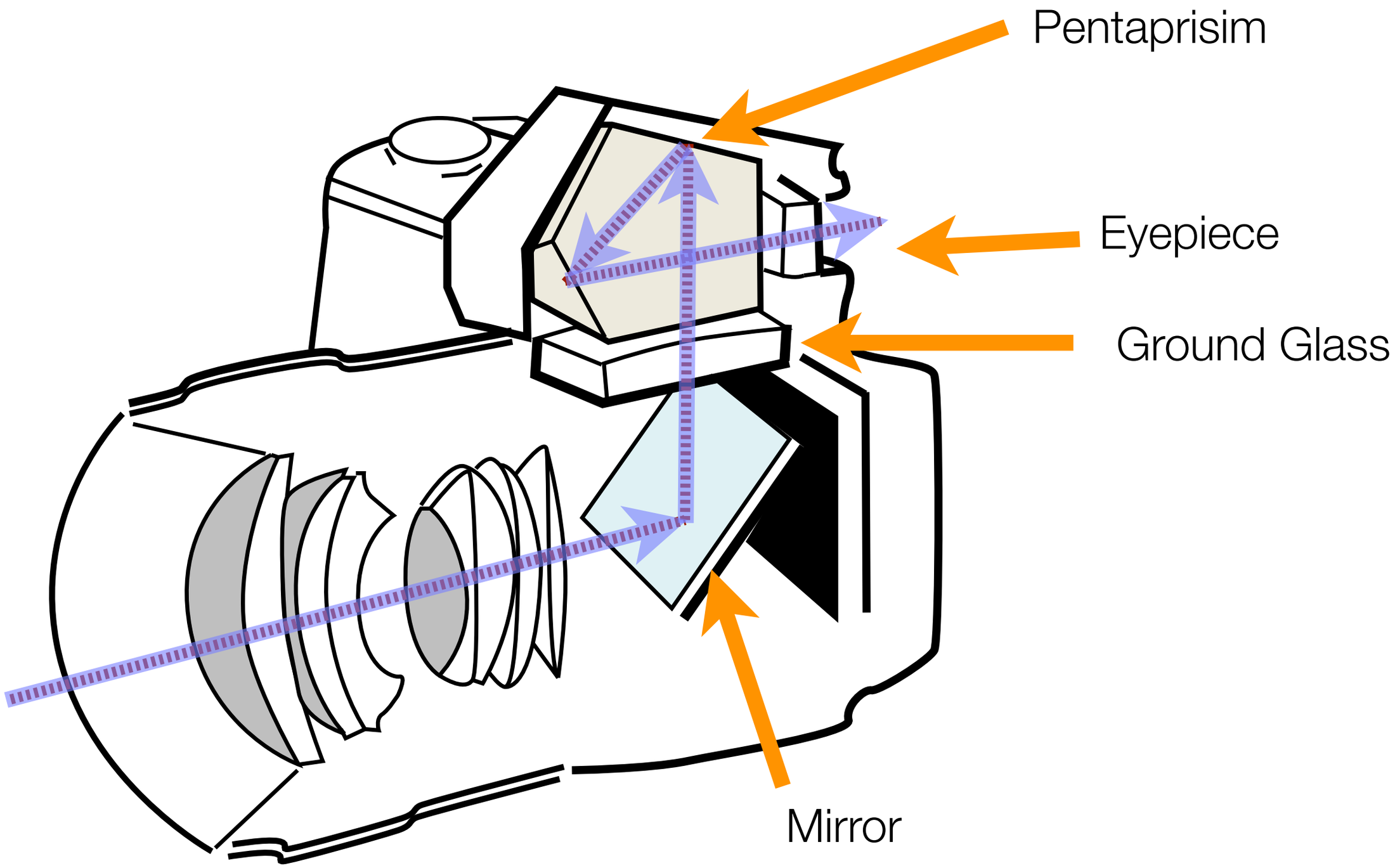
Demo: lens coming off camera
Demo: mirror flipping up

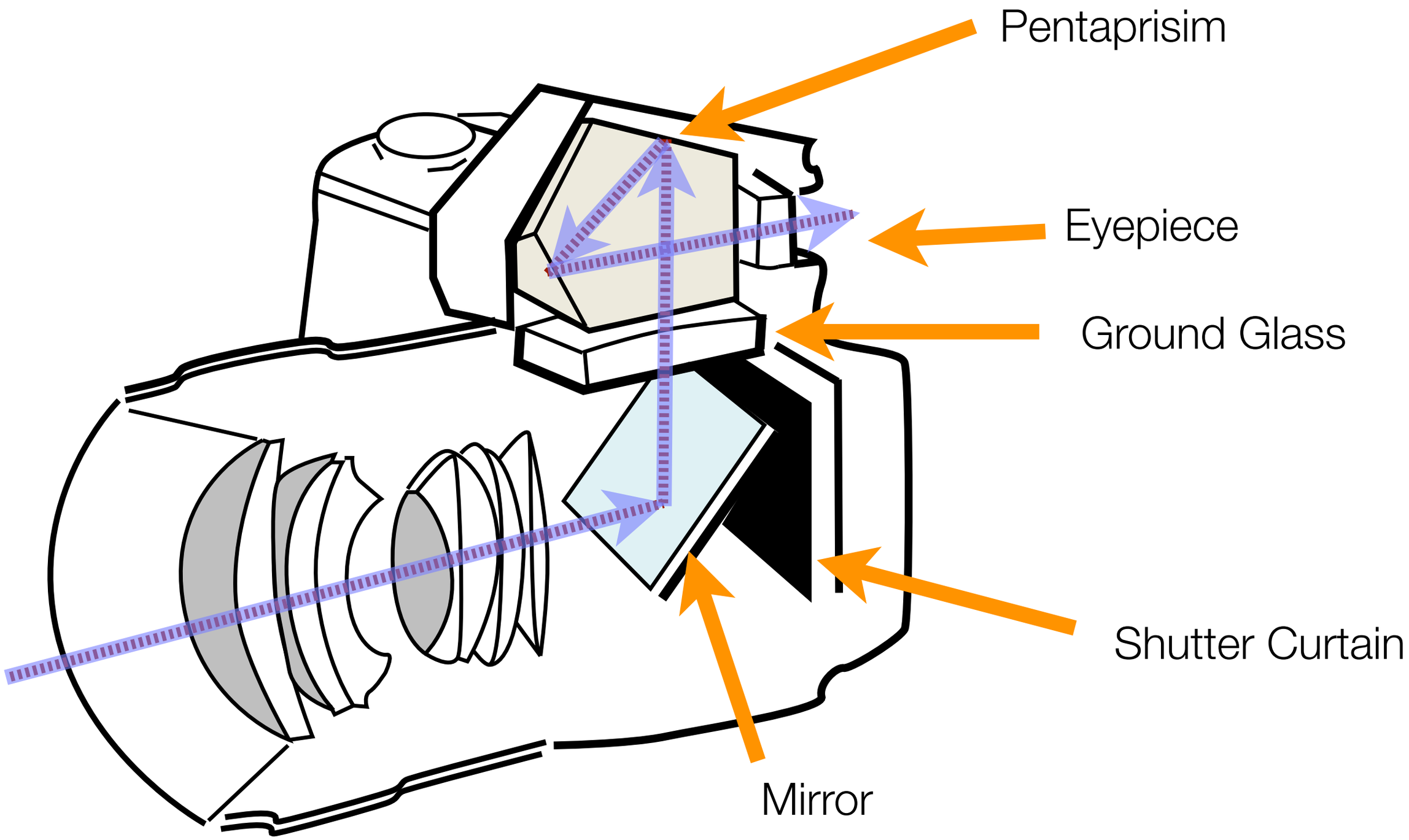


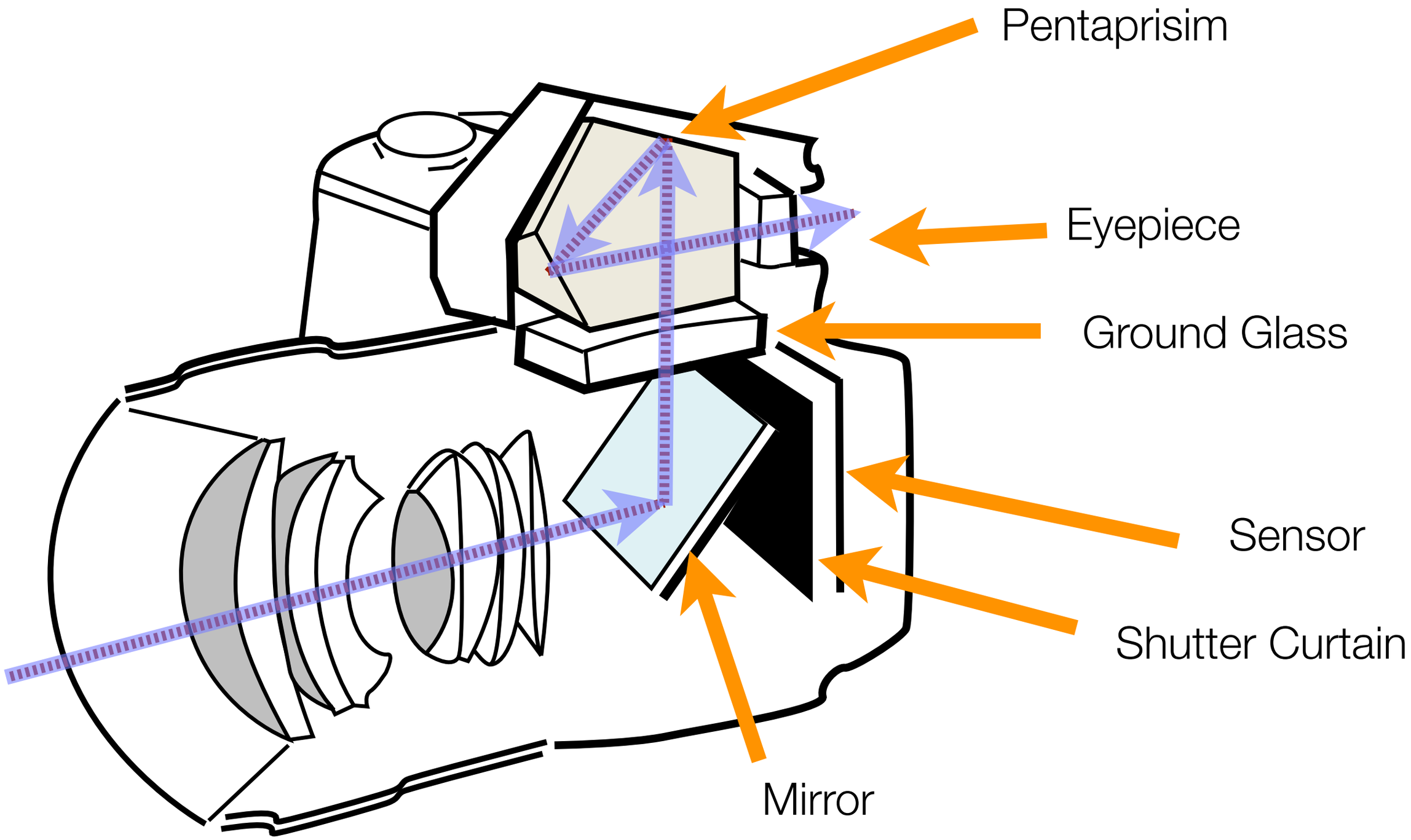

Mirror


Ground Glass
Mirror


Pentaprisim
Ground Glass
Mirror


Pentaprisim
Eyepiece
Ground Glass
Mirror


Pentaprisim
Eyepiece
Ground Glass
Shutter Curtain
Mirror


Pentaprisim
Eyepiece
Ground Glass
Sensor
Shutter Curtain
Mirror

How to hold a dSLR.

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A basic look at interfaces.

entry-level dSLRs

shutter release button

Nikon D5100

Canon 550D

mid-level + dSLRs

Nikon D7000

Canon 60D

Nikon

Canon

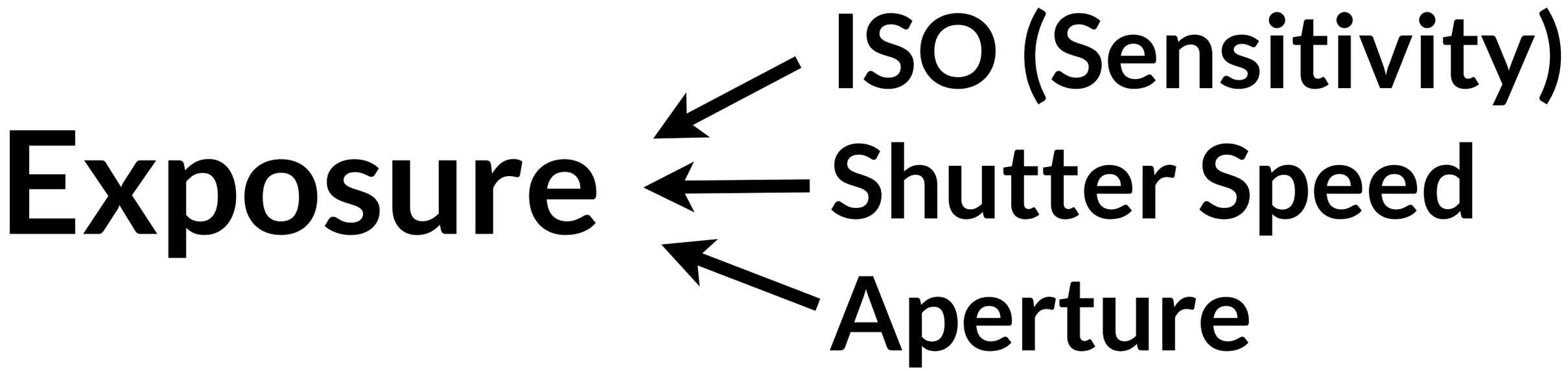
M - manual
A (Av) - aperture
S (Tv) - shutter/time

Nikon

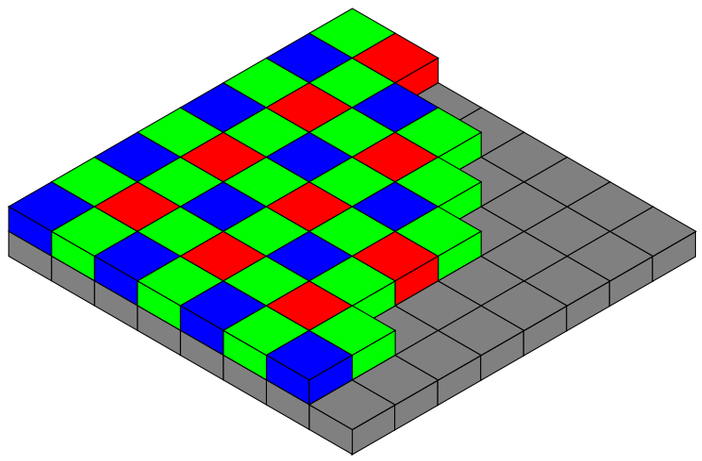
Canon

What happens in auto?

Usually, a sensor sits just under the mirror of your camera and measures the intensity


Exposure
ISO (Sensitivity)
Shutter Speed
Aperture

ISO?



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ISO = Hardware gain

200 ISO

- Daylight
- Bright, bright studio lighting

400-1600 ISO

- Outdoors, action shots
- Indoors, adequate lighting
- Shade

3200+ ISO

- Indoors, poor lighting
- Indoors, action shots
- Night time (+ some software gain)

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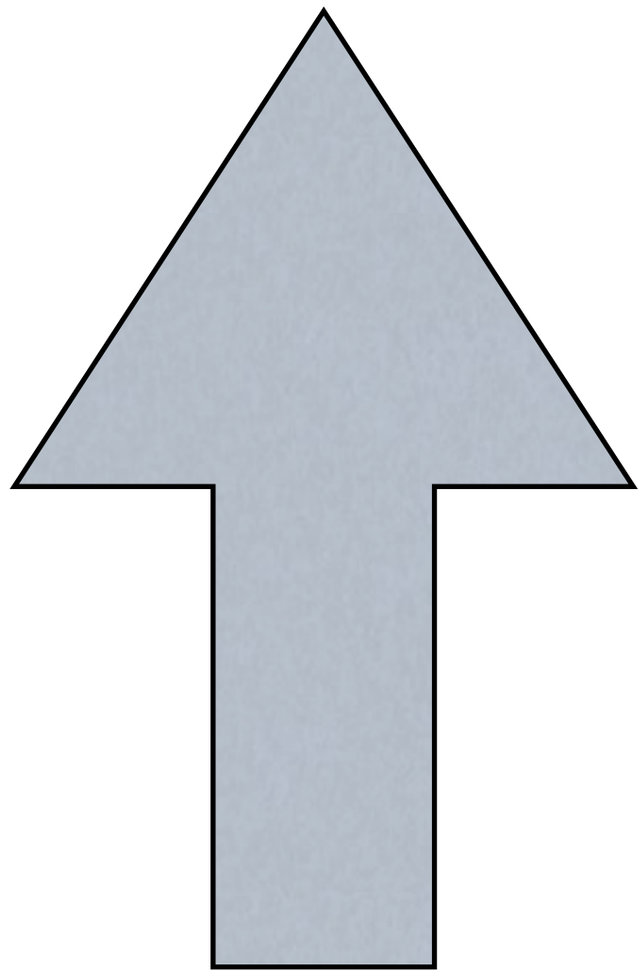
This is cool, why not keep 3200+ ISOs all the time?
Well...for one having a waaay too sensitive sensor in broad daylight can oversaturate it and possibly destroy it.

3200+ ISO

More noise



200 ISO

Less noise

Shutter Speed?

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Demo slow and fast shutter speeds

B Bulb.

Stays on for as long as you press the shutter button.

T

Time.

Keeps the shutter open when you press the shutter button once. Closes the shutter when you press the button a second time.

speeds ≤ 1/1000 s

Captures fast action. Needs a lot of light.

1/60 s ≥ speed > 1/1000 s

Medium action. People walking.

1/2 s ≥ speed > 1/60 s

Tripods become necessary, especially with shaky hands. Not really enough to capture too much of motion trail, just motion blur.

speed ≥ 1” s

Longer motion trails. Needs an area with less light, or a small aperture.

1/1250 sec

1/250 sec

1/50 sec

panning at 1/50 sec

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Aperture?

Aperture

The faucet valve for light.

f/2

Aperture

The faucet valve for light.

f/2.8

Aperture

The faucet valve for light.

f/4

Aperture

The faucet valve for light.

f/5.6

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Aperture

The faucet valve for light.

f/8

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Aperture

The faucet valve for light.

f/22

(dolcepics.com)

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How do I pick the correct setting?

“Correctness” is relative.

Choosing the right setting, especially programmatically, is difficult.

How do I think like the camera?

1. Meter

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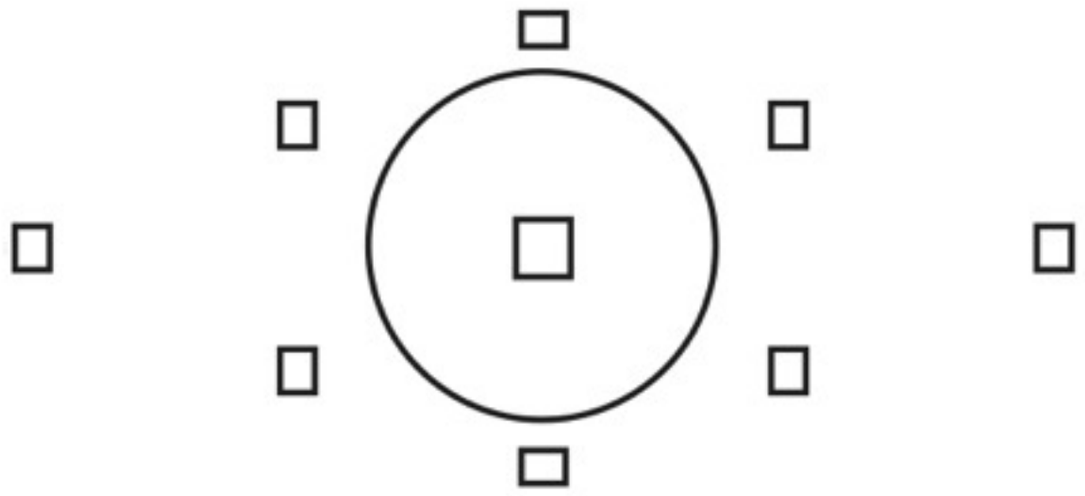
Put your camera in manual mode!

“M” mode!



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2. Adjust shutter speed.

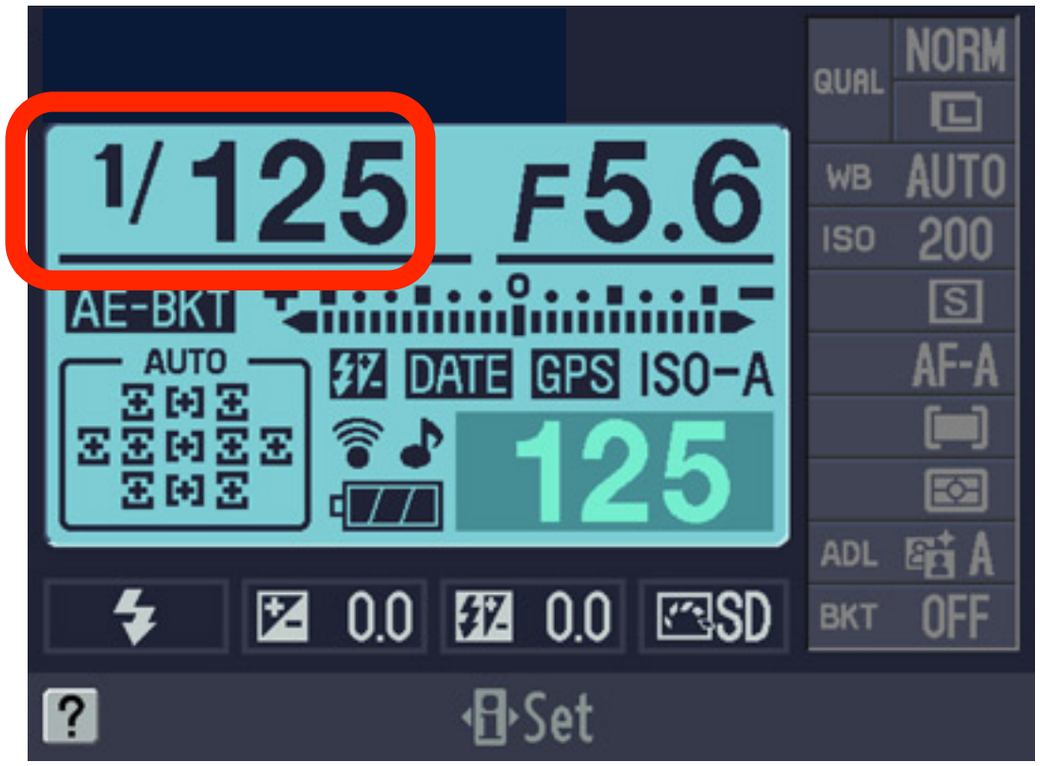
entry-level dSLRs

adjusting command dial
for **shutter speed**

Nikon

Canon

Canon



Nikon

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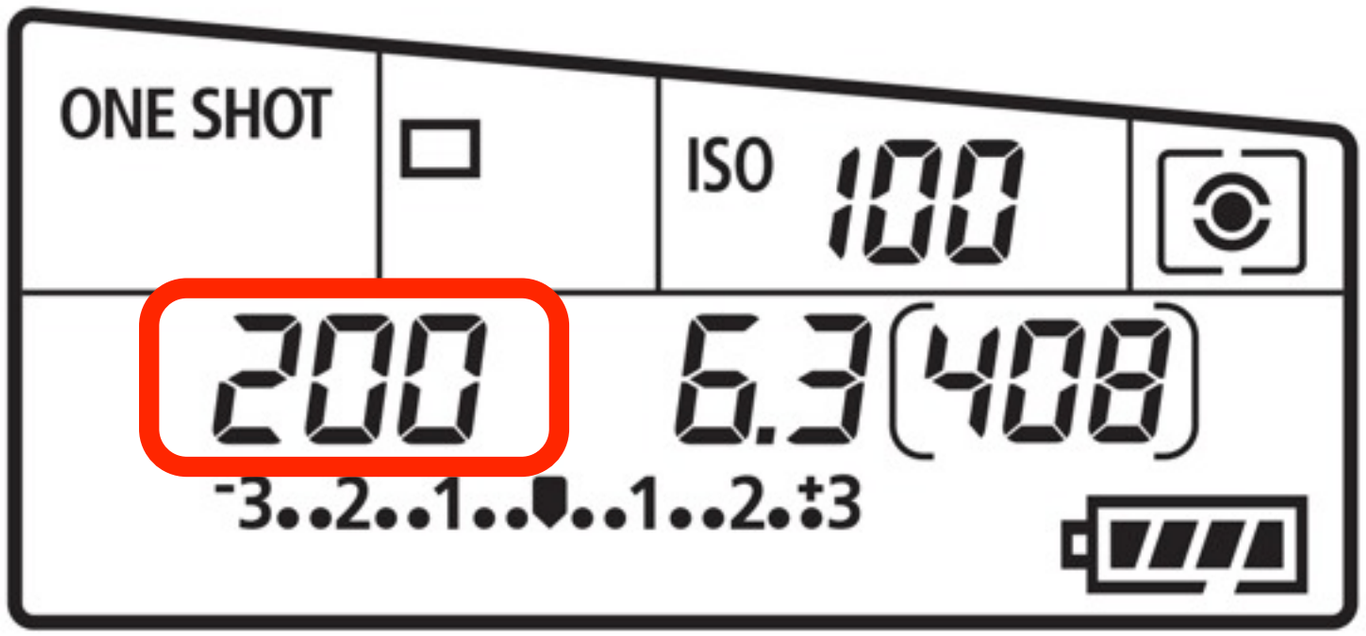
Canon – DISP button
Nikon – Info button

mid-level + dSLRs

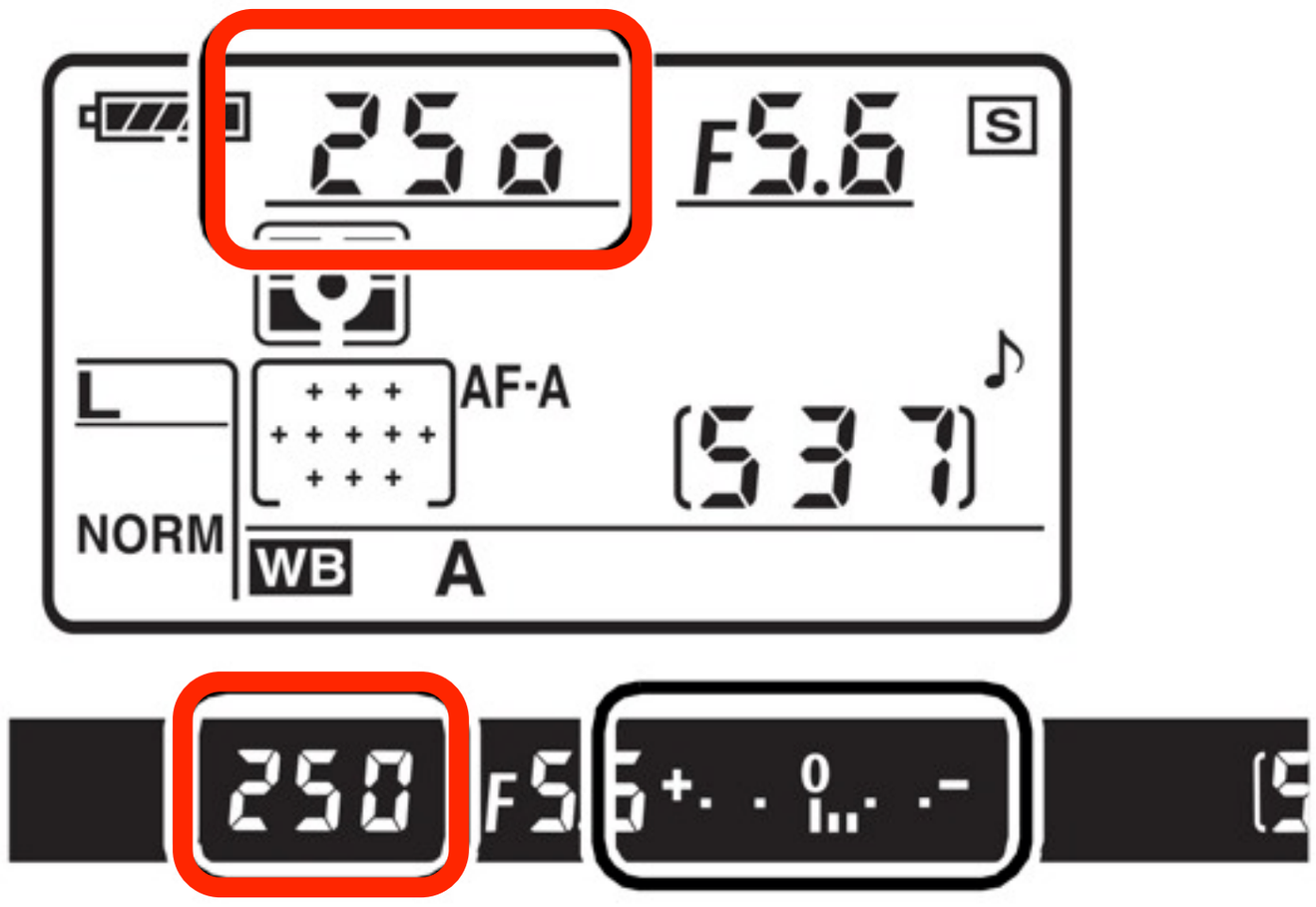
adjusting (primary) command dial
for **shutter speed**

Nikon

Canon


ONE SHOT
ISO 100
200
6.3 408
-3..2..1..0..1..2..+3

Canon


25o
F5.6
S
AF-A
NORM
WB
A
250
F5

Nikon

8000 to **4** indicate denominator of fractional speed. (125 = 1/125)

0”5 = 0.5 sec

15” = 15 sec

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2. Adjust aperture.

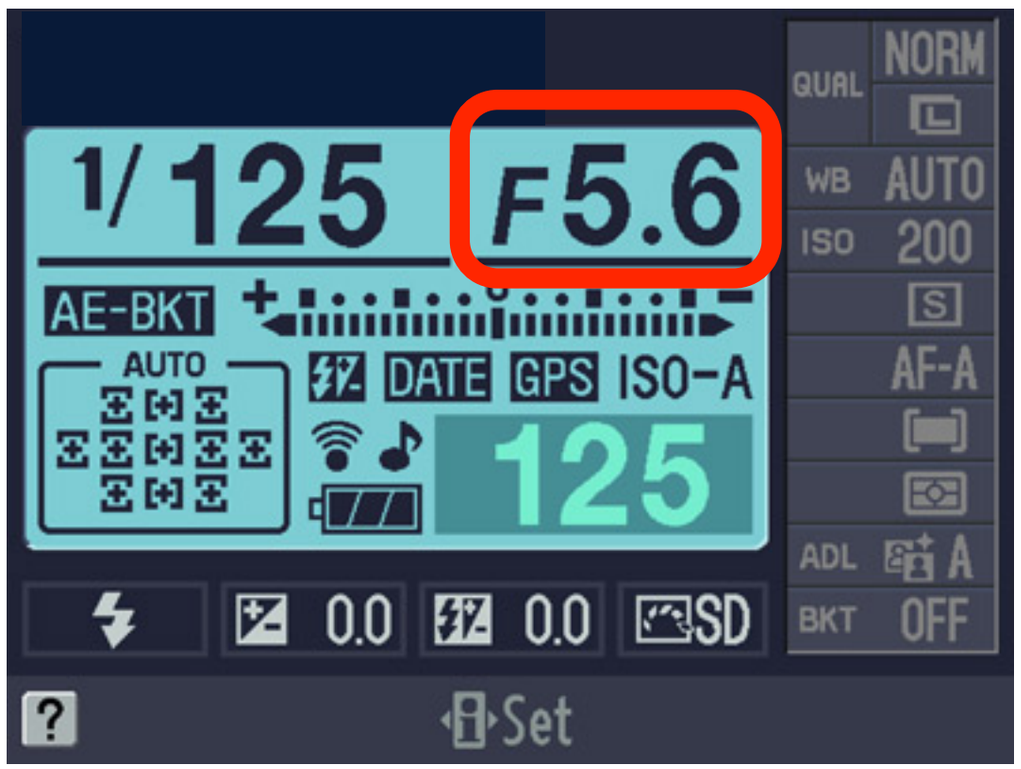
entry-level dSLRs

adjusting aperture

Nikon

Canon

Canon



Nikon

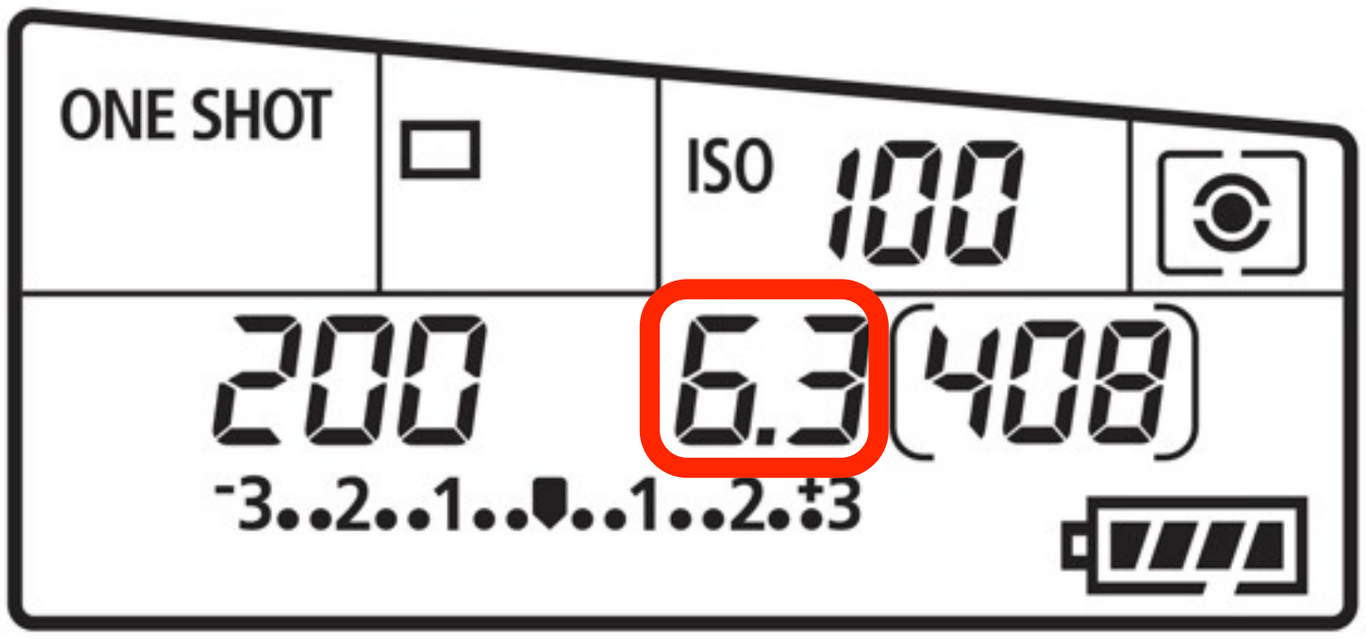
Canon – DISP button
Nikon – Info button

mid-level + dSLRs

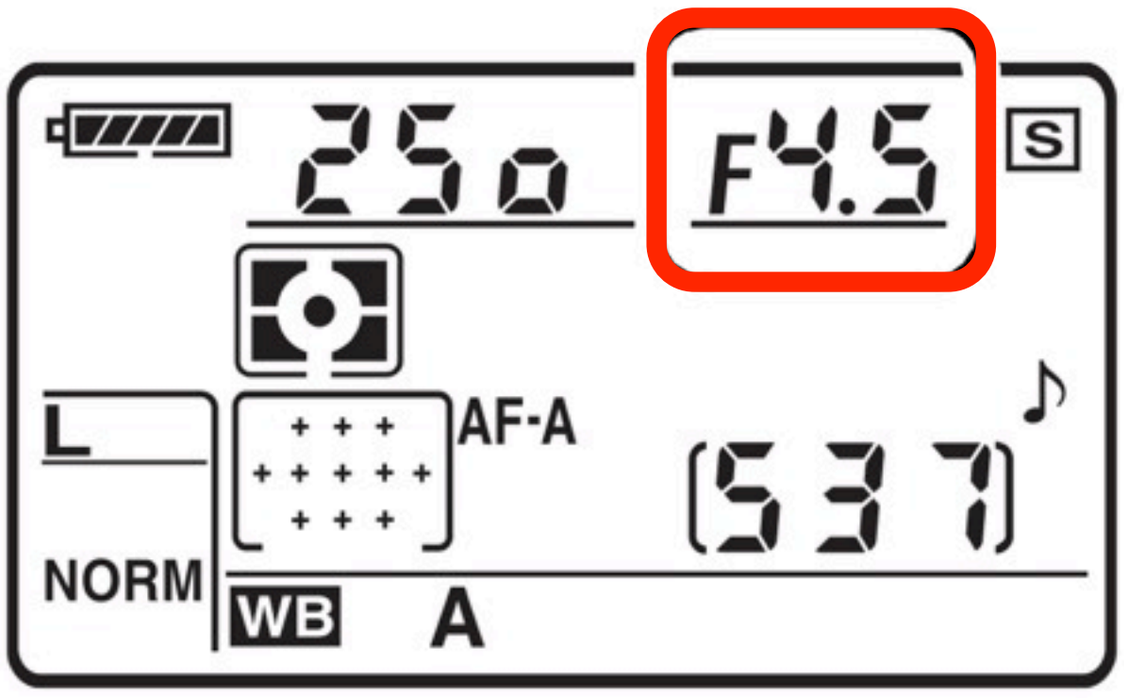
adjusting aperture

Nikon

Canon

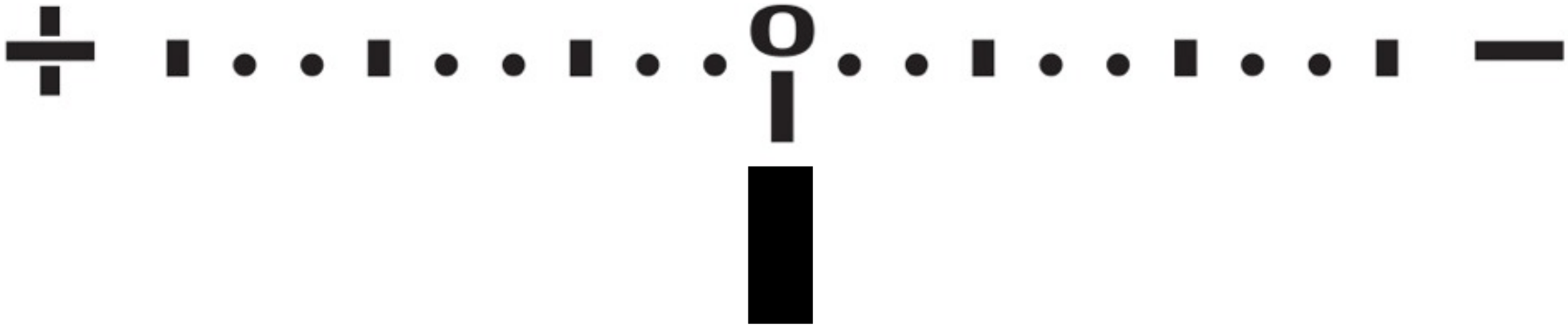

ONE SHOT
ISO 100
200
6.3
408
-3..2..1..0..1..2..+3

Canon


250
F4.5
S
AF-A
537
L
NORM
WB
A

250
F4.5
0

Nikon



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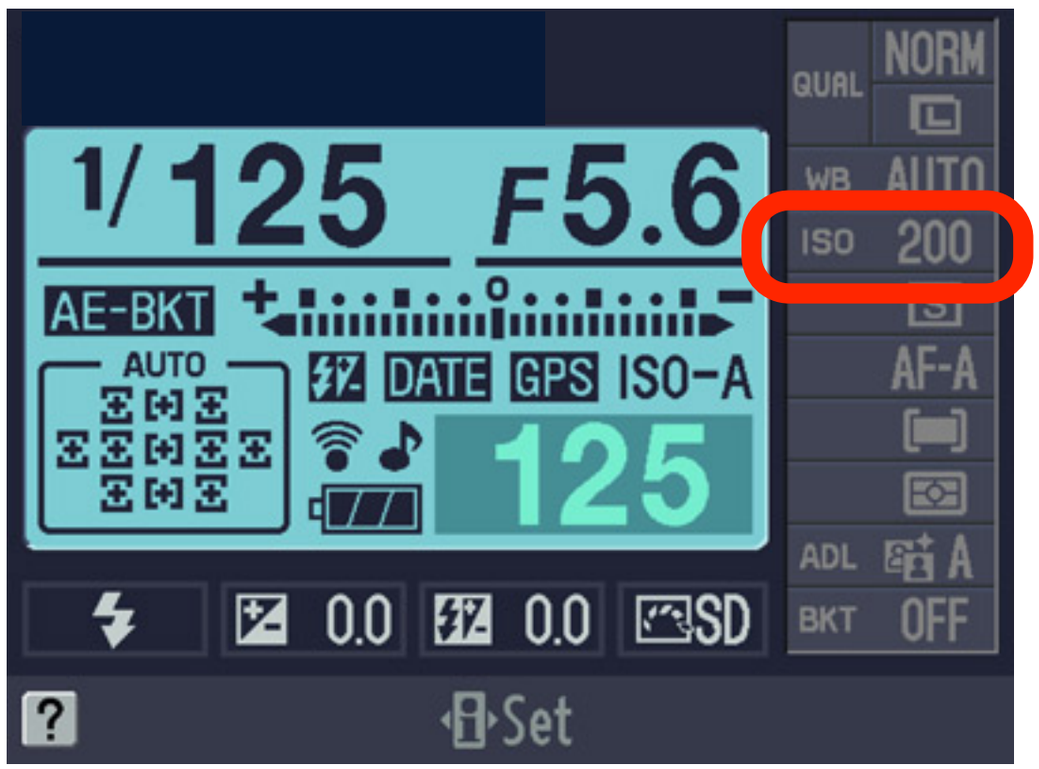
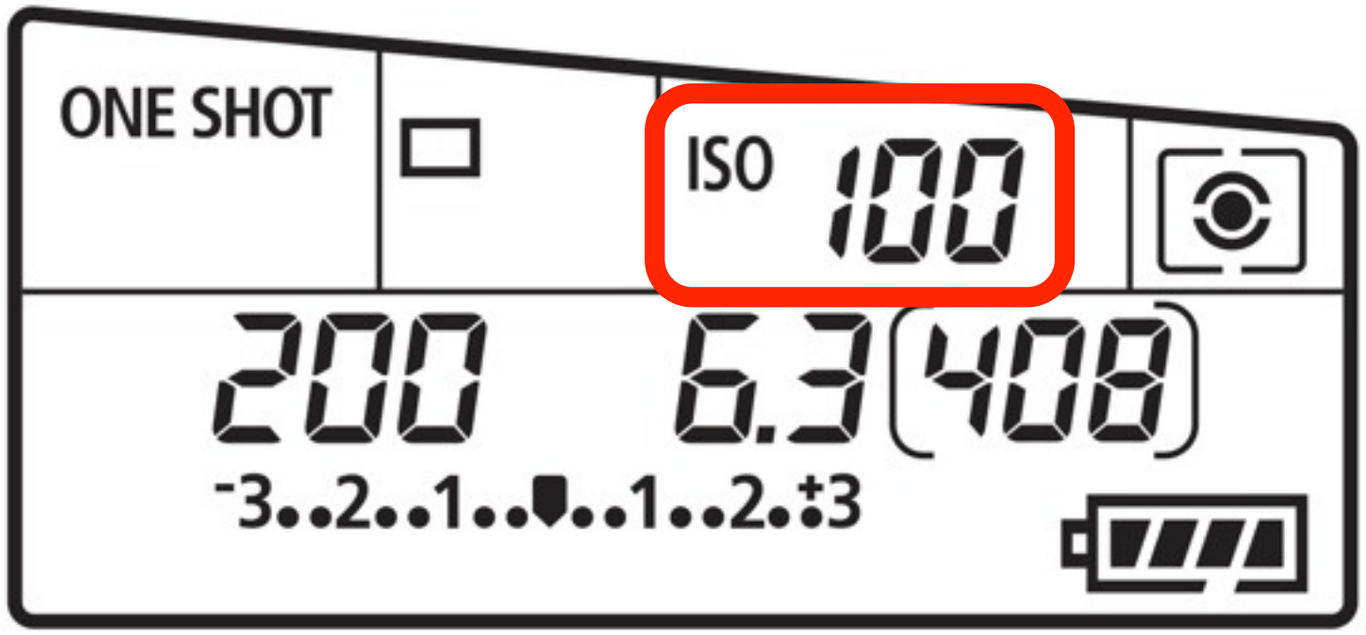
Canon



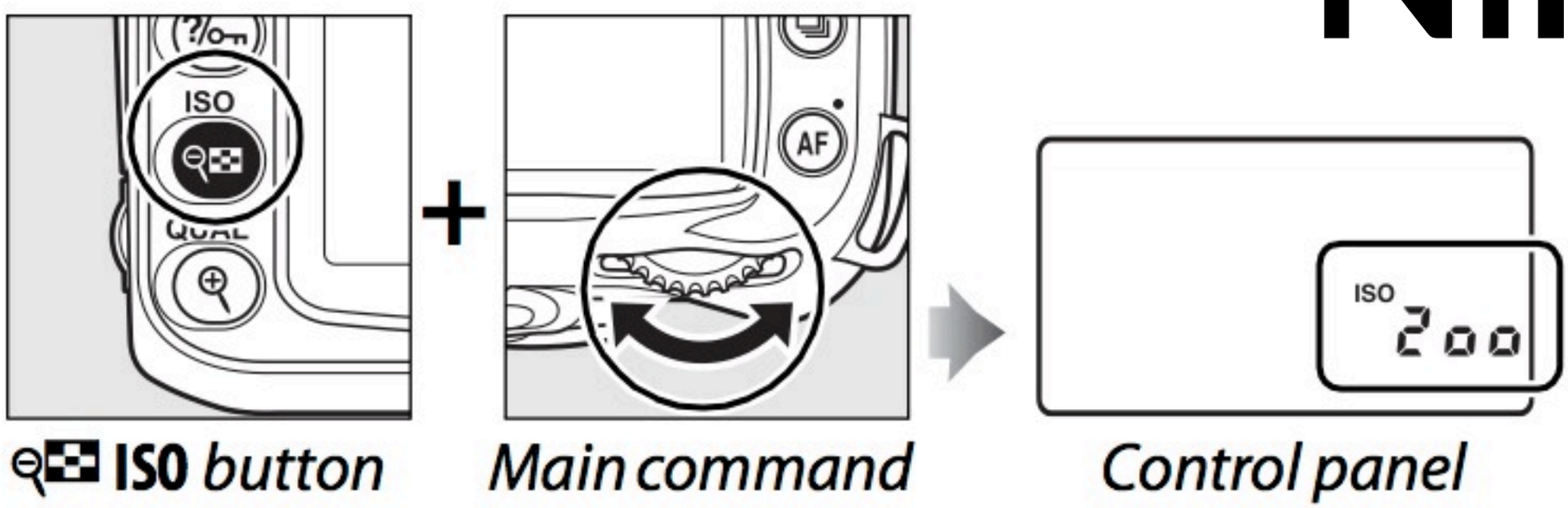
Nikon

Canon – DISP button
Nikon – Info button



Canon

Nikon



ISO button + Main command dial → Control panel

\+ Over exposed

\- Under exposed

← over exposure

under exposure →

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1/1000 s

1/500 s

1/250 s

1/125 s

1/60 s

1/30 s

1/15 s

1/8 s

1/4 s

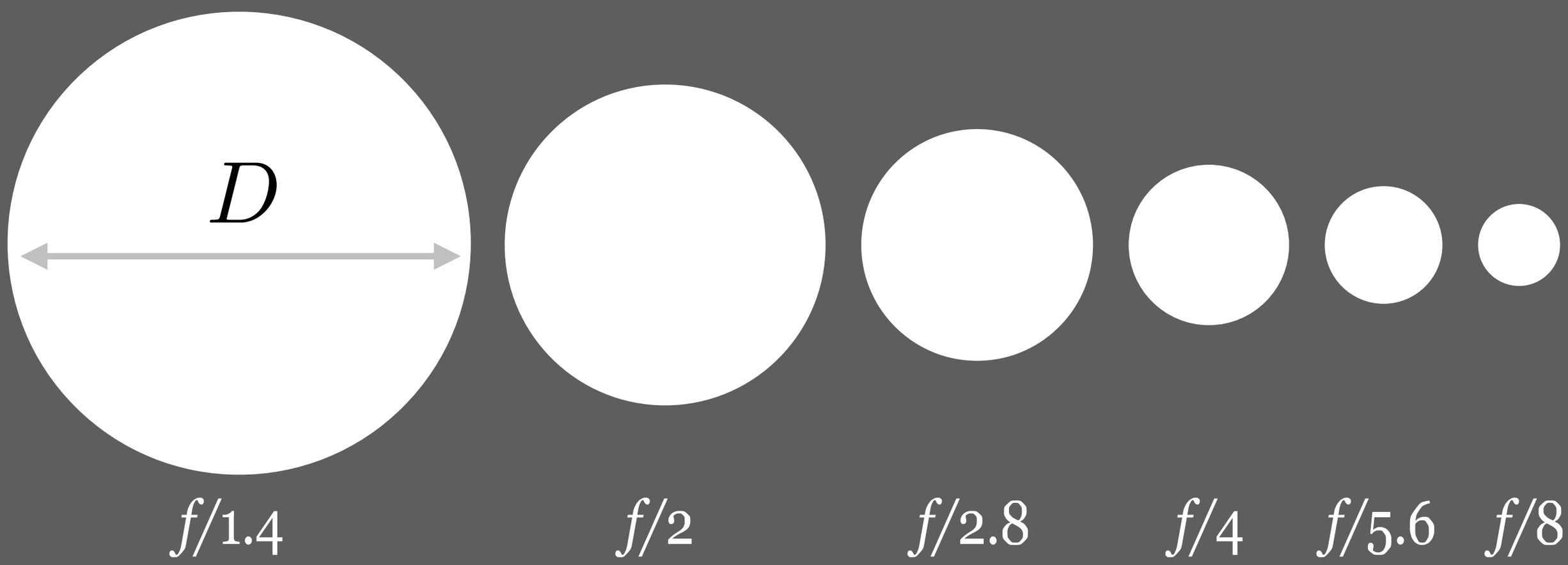
1/2 s

1 s

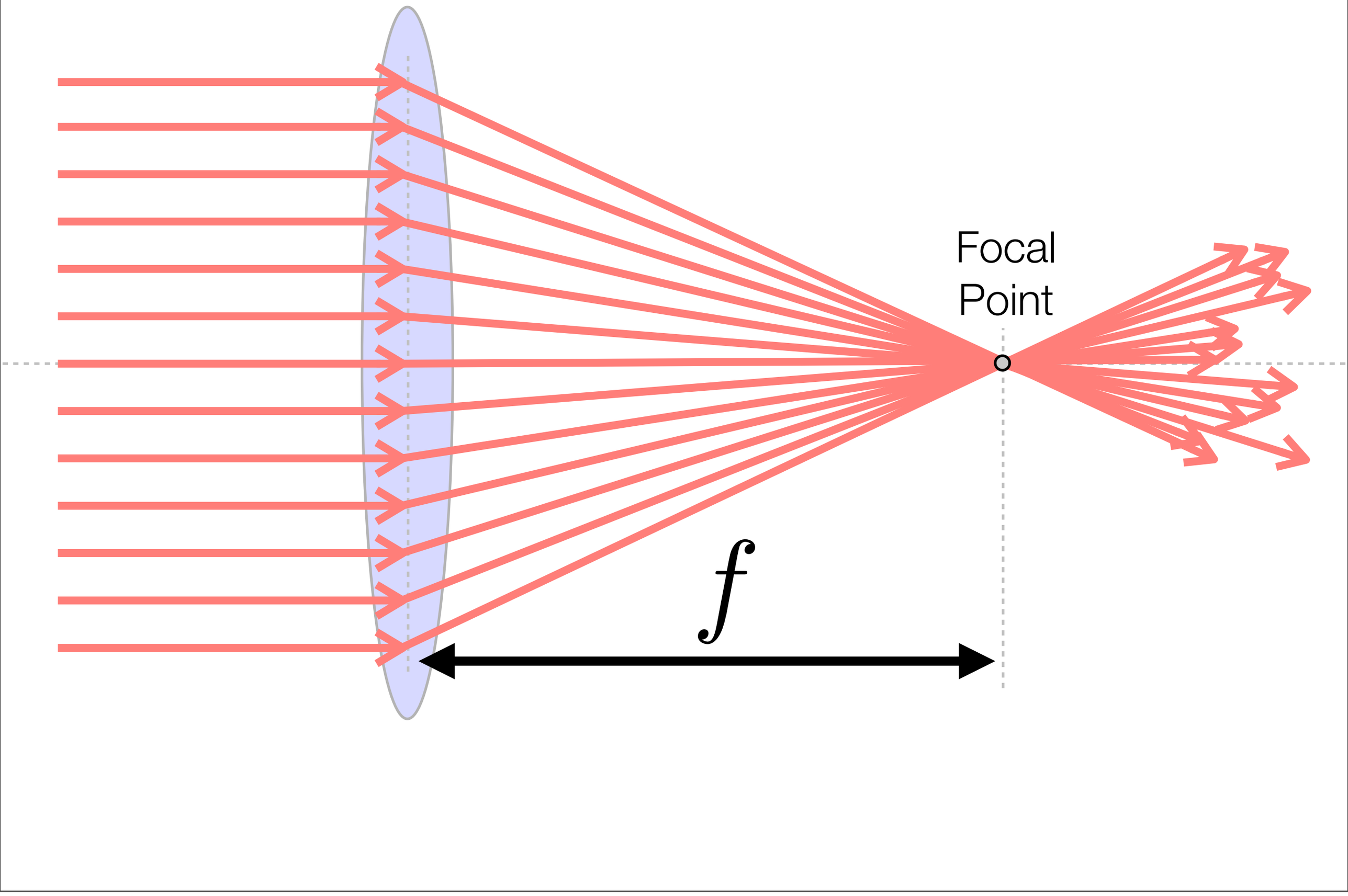
less light

more light

$$N = \frac{f}{D}$$



1/2 the area for each “stop”


Focal
Point
f

Aperture + Shutter Speed

A relationship of stops.

f/2

1/1000 s

Aperture + Shutter Speed

A relationship of stops.

f/2.8 **1/500 s**

1/2 light 2x **time**

Aperture + Shutter Speed

A relationship of stops.

f/4

$(1/2)^2$ light

1/250 s

2^2 x **time**

Aperture + Shutter Speed

A relationship of stops.

f/5.6 **1/125 s**

$(1/2)^3$ light 2^3 x **time**

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Aperture + Shutter Speed

A relationship of stops.

f/8

$(1/2)^4$ light

1/60 s

$\sim 2^4$ x **time**

(dolcepics.com)

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1/62.5th of a second, but really rounded down

Each pair does something different.

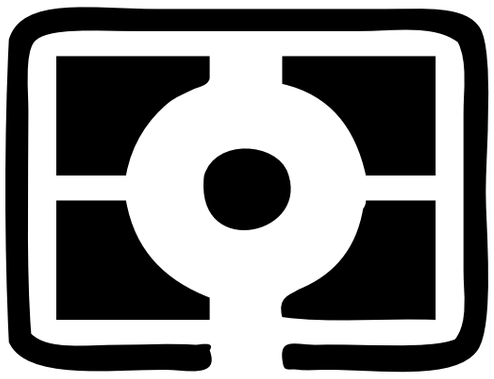
And we'll learn more in depth about this tomorrow!

Choosing how to meter.

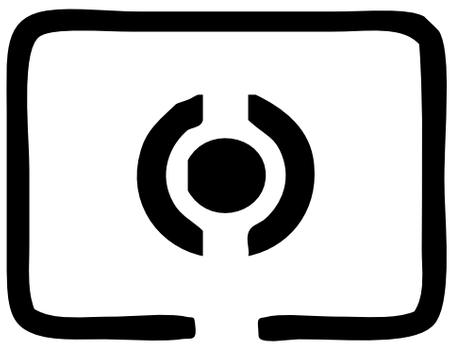
And we'll learn more in depth about this tomorrow!

Nikon

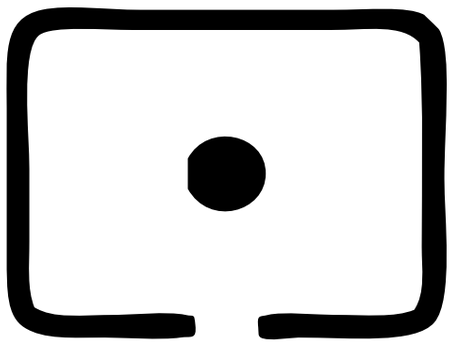
And we'll learn more in depth about this tomorrow!



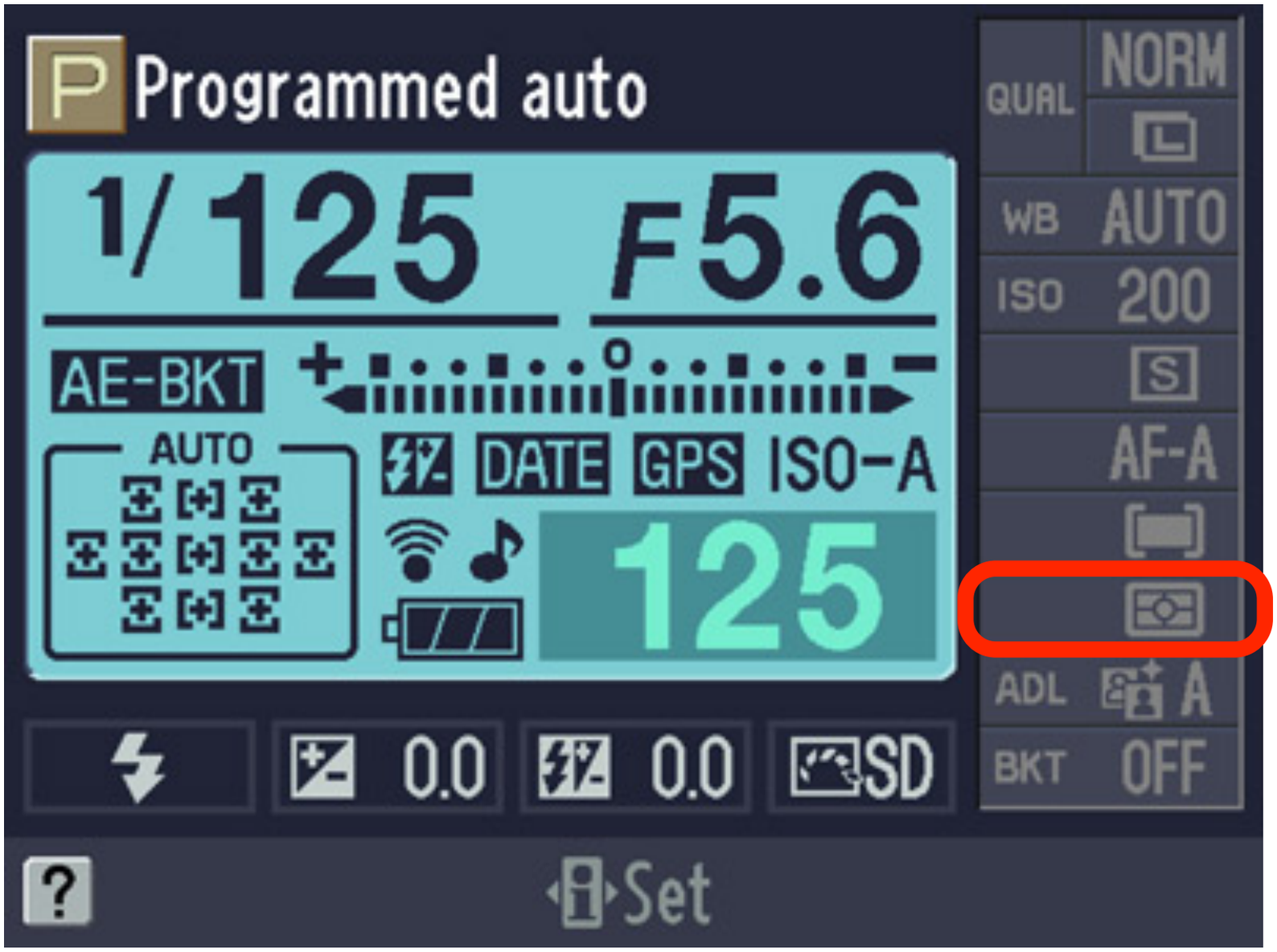
Matrix Metering
Meters a wide range of the scene



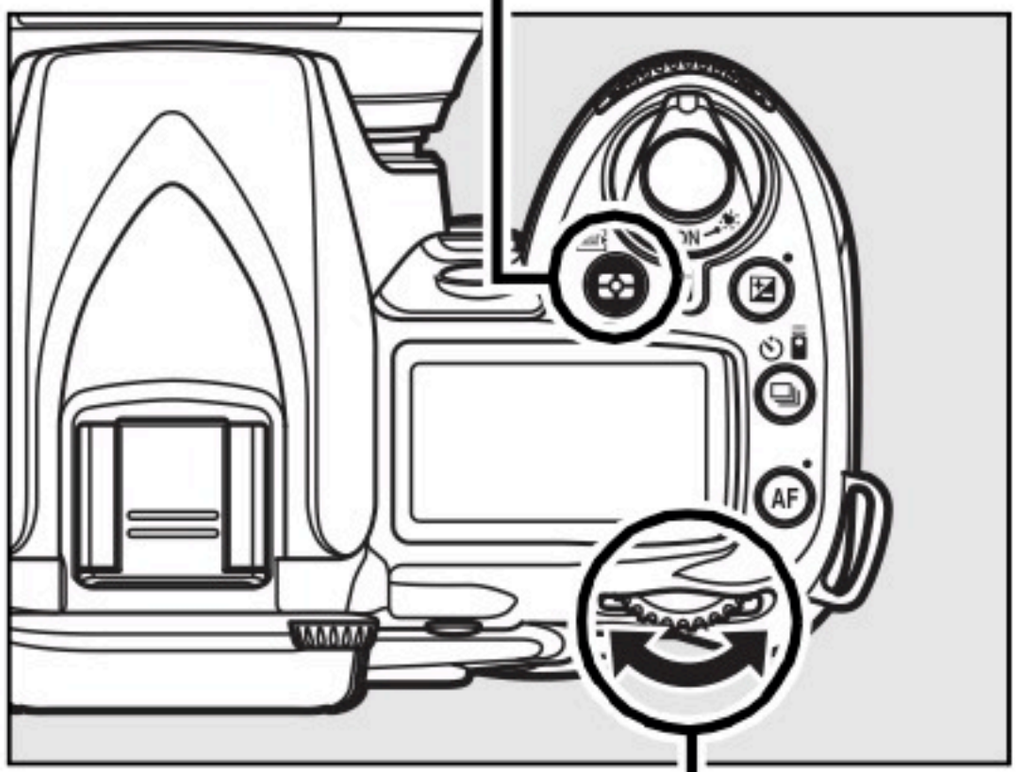
Center Weighted
Meters a wide range of the scene

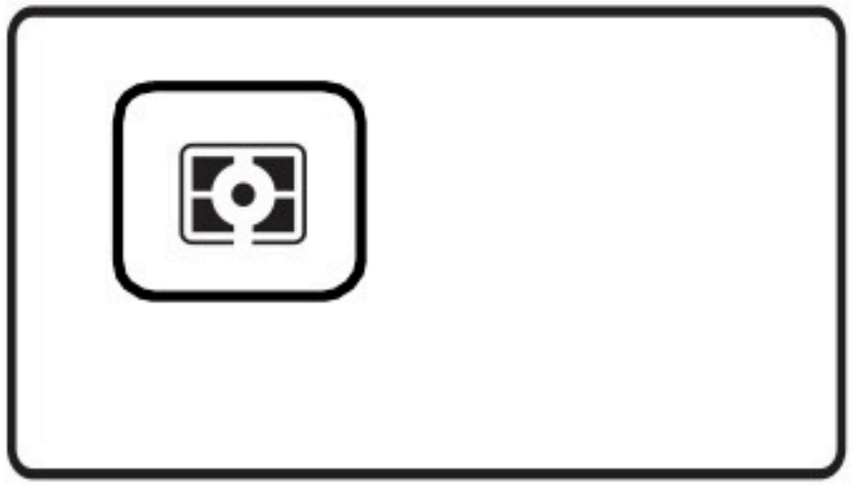


Spot Metering
Meters at the focus point


Programmed auto
1/125
F5.6
AE-BKT
AUTO
DATE
GPS
ISO-A
125
QUAL
NORM
WB
AUTO
ISO
200
AF-A
ADL
A
BKT
OFF
0.0
0.0
SD
Set

button



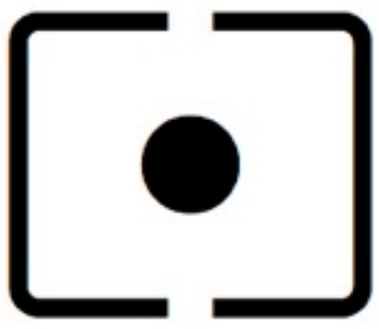


Main command dial

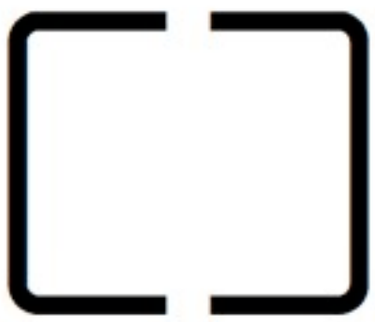
Canon

Evaluative metering

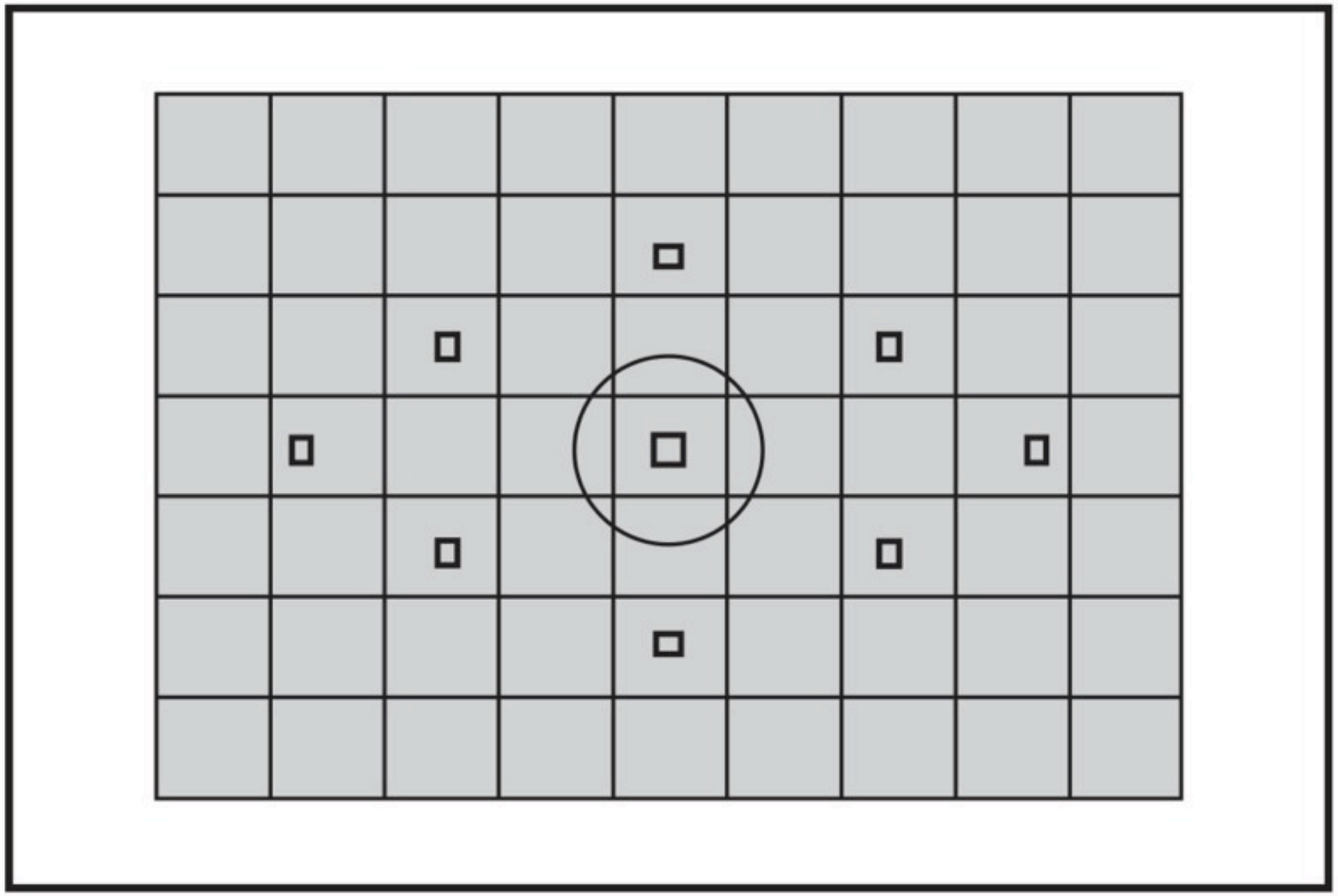
Partial metering



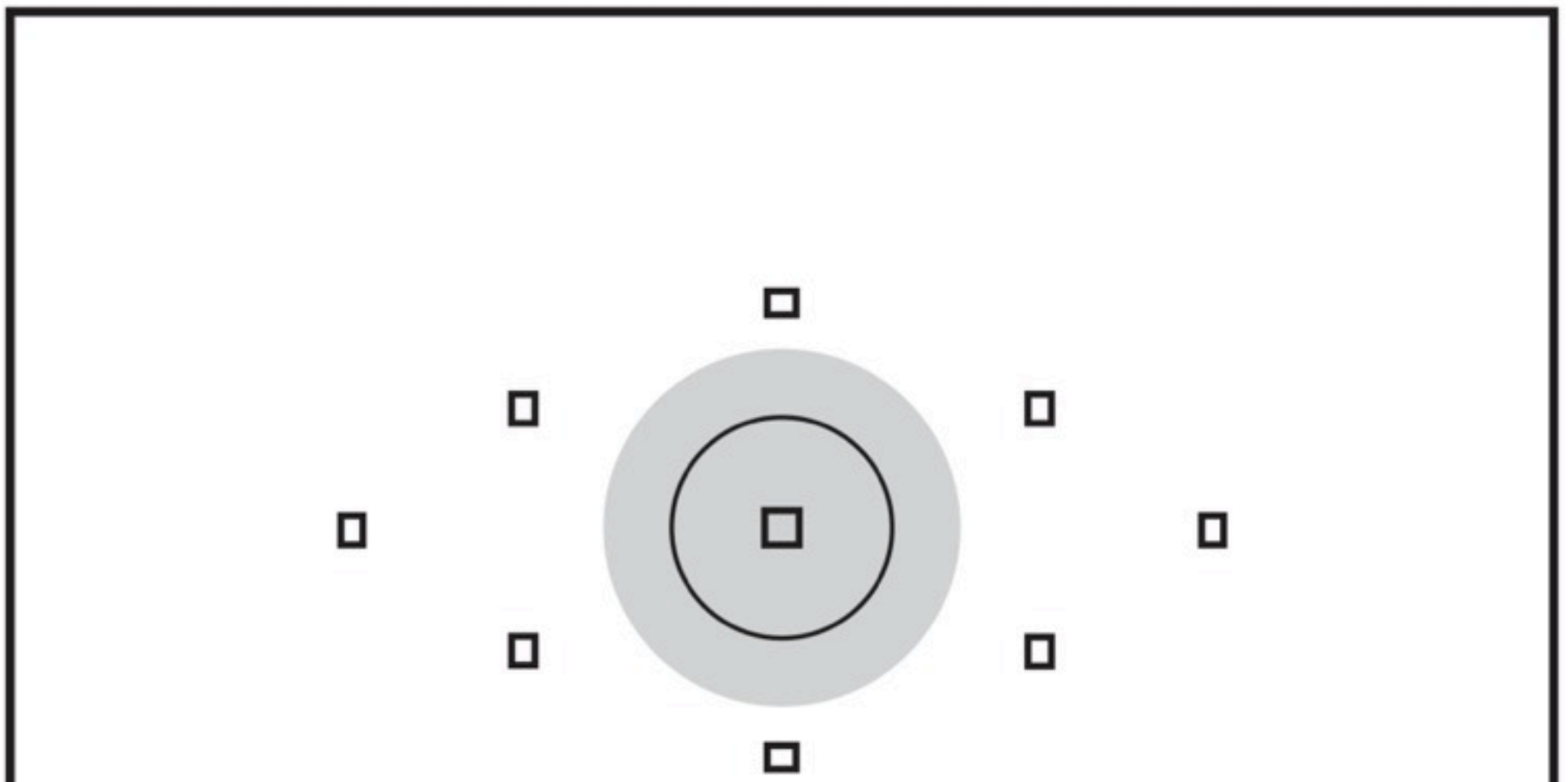
Spot metering



Center-weighted average



Evaluative metering



Partial metering

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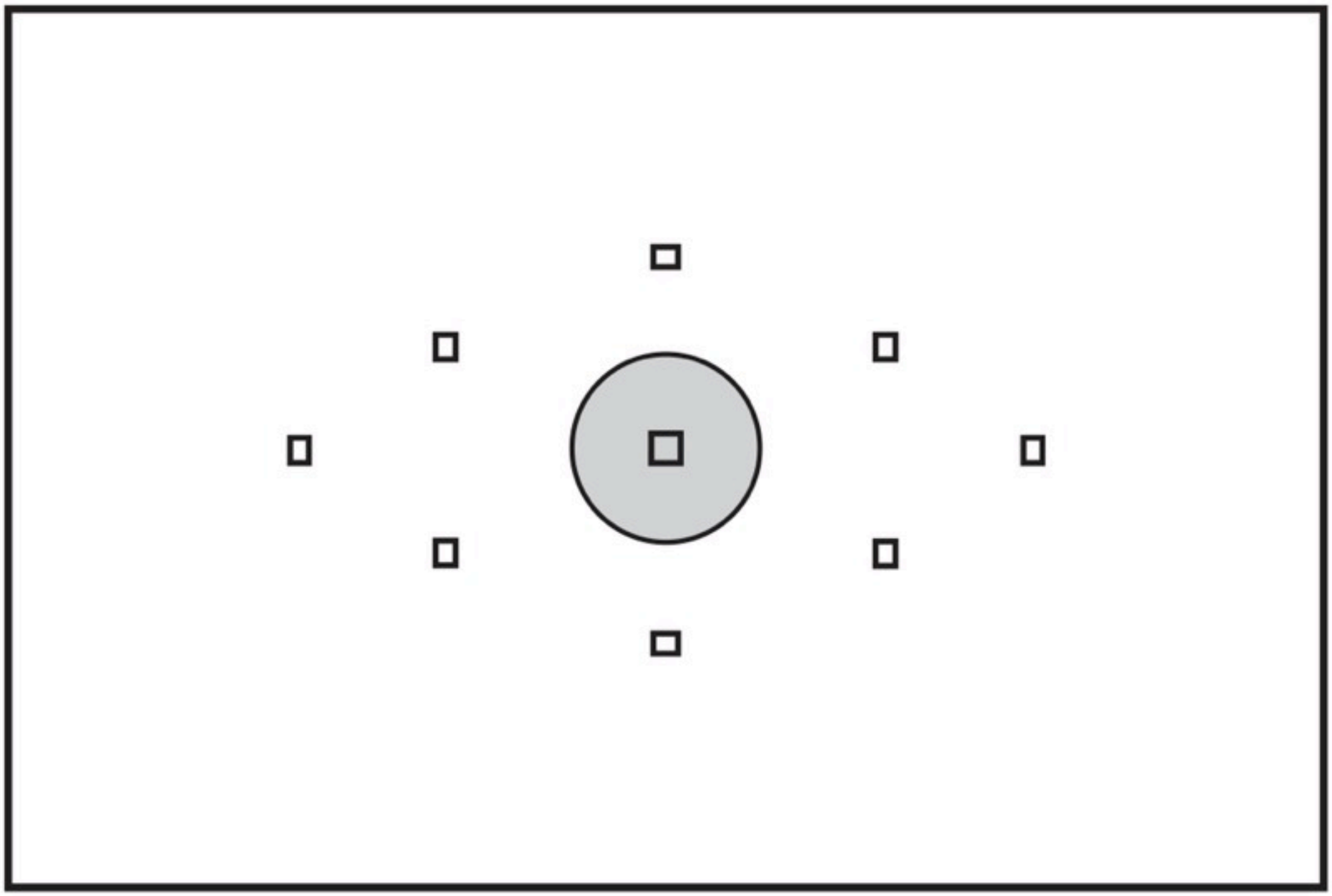
Effective when the background is much brighter than the subject due to backlighting, etc.
Partial metering covers approx. 6.5% of the viewfinder area at the center



Spot metering

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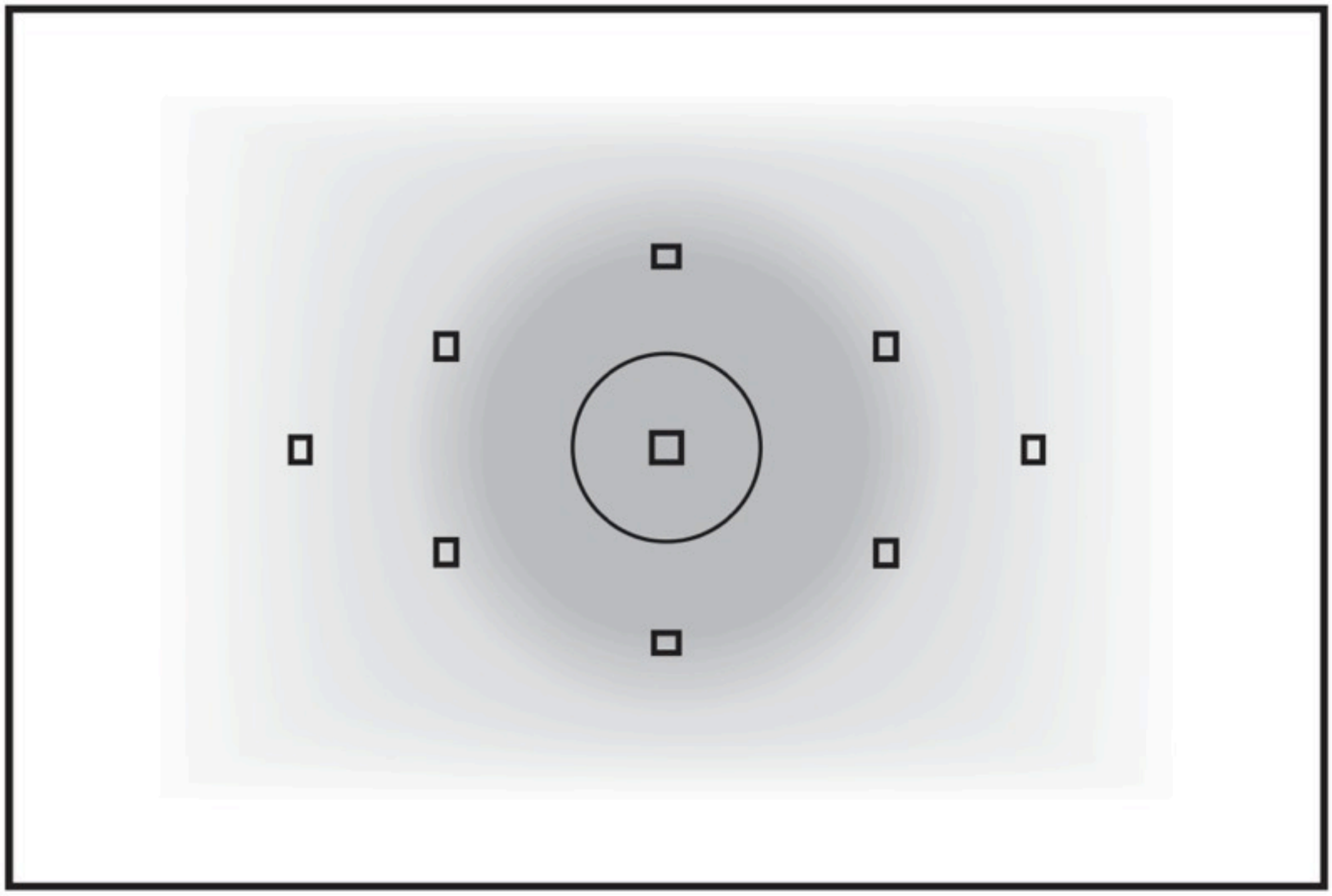
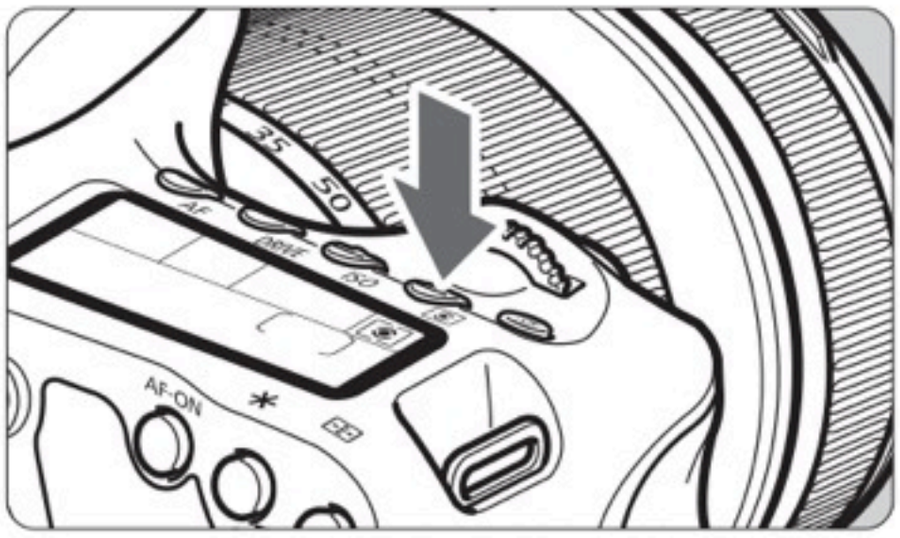
This is for metering a specific spot of the subject or scene. The metering is weighted at the center covering approx. 2.8% of the viewfinder area.



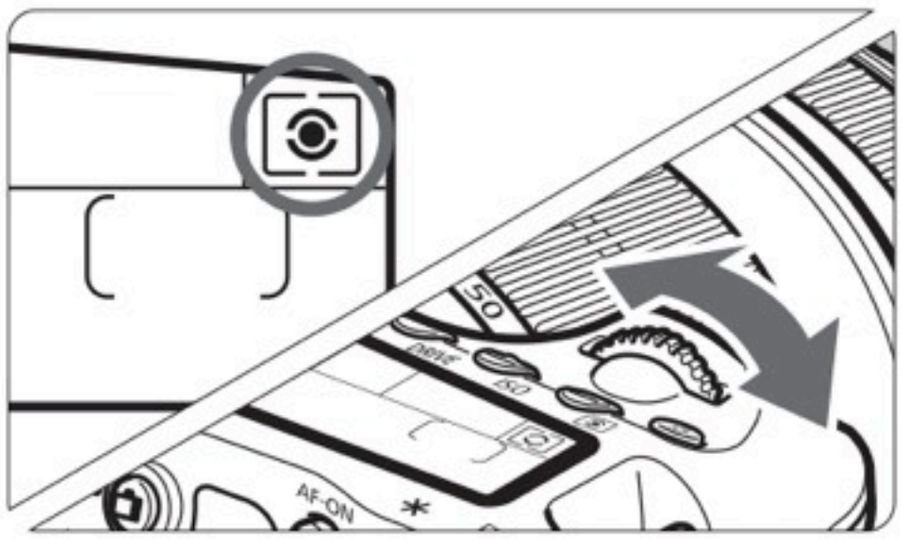
Center-weighted average

The metering is weighted at the center then averaged for the entire scene.

1/125
F5.6
ISO800
M
-2..1..0..1..+2
S
AWB
WB
+/-
RAW+L
MF
Q
219



1 Press the <⊙> button. (⏱6)

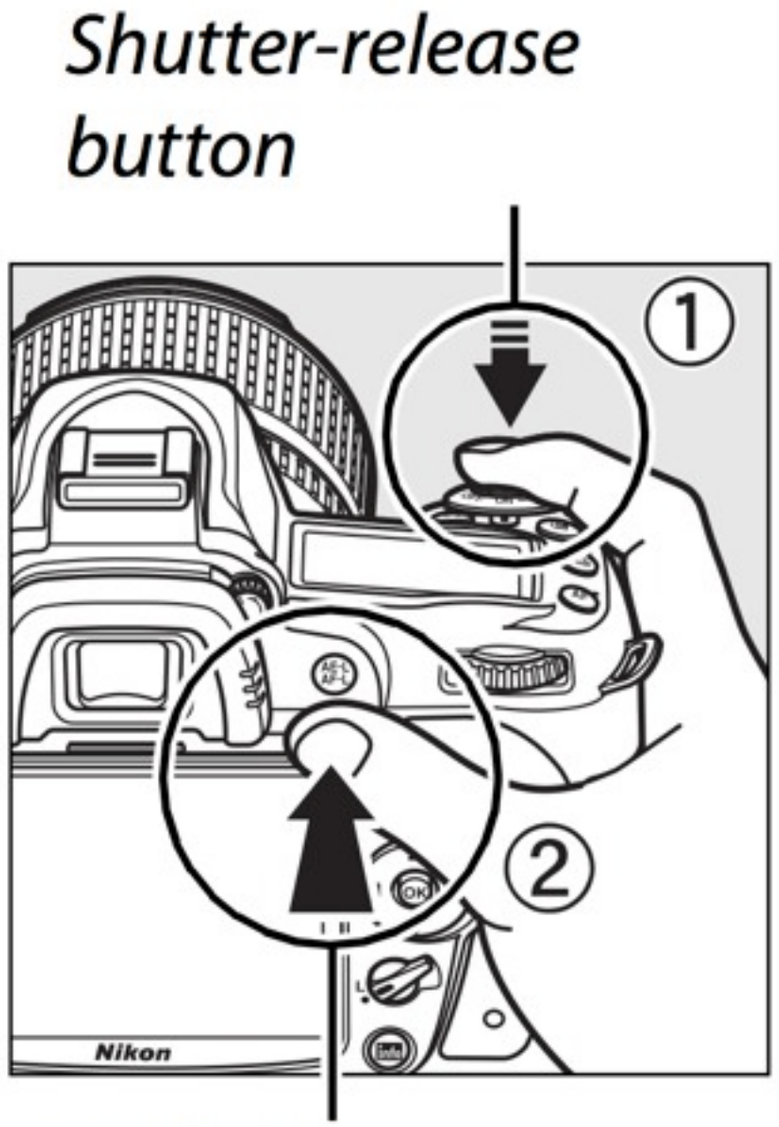


2 Select the metering mode.

- While looking at the LCD panel, turn the <⚙> dial.

(Autoexpsoure) AE-Lock

Nikon



AE-L/AF-L *button*

Canon

ISO
ON
OFF
A-DEP
P
Tv
Av
M
CA

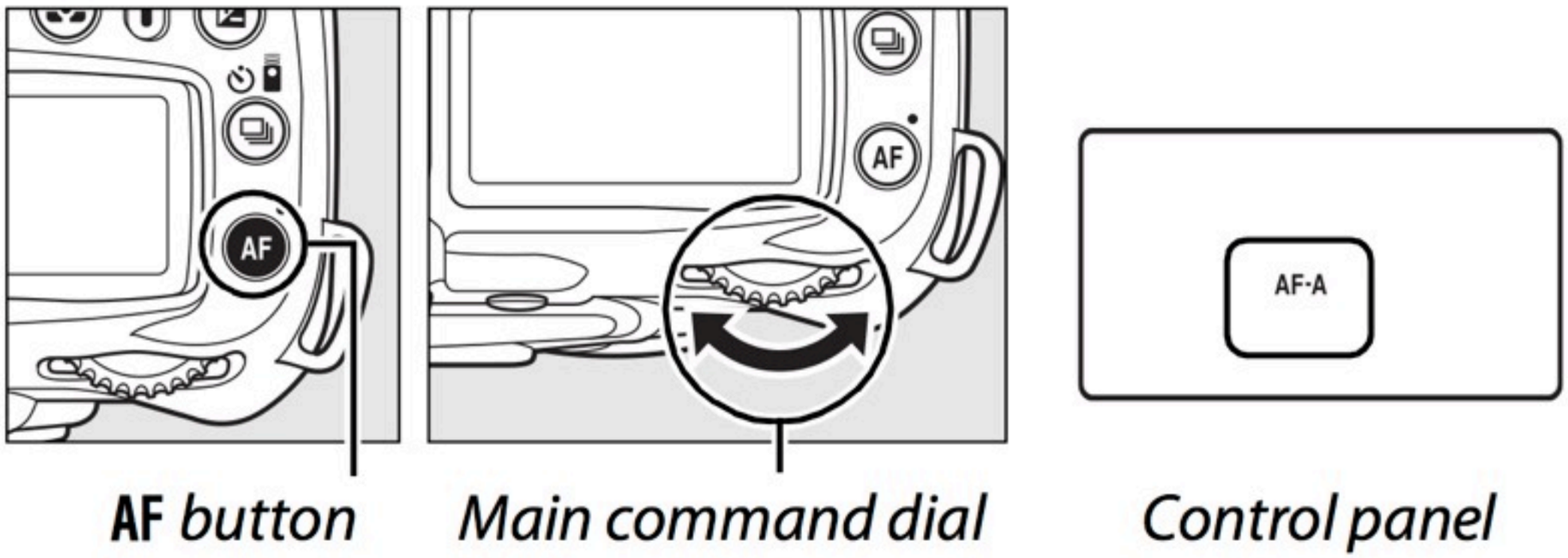
AF
DRIVE
ISO
SERVO
H
ISO 6400
8000
0.0
443
AF-ON

Choosing what to focus...quickly.

And we'll learn more in depth about this tomorrow!

Autofocus (AF) Modes (Nikon)

AF-A - auto select
AF-S - single servo AF
AF-C - continuous servo AF



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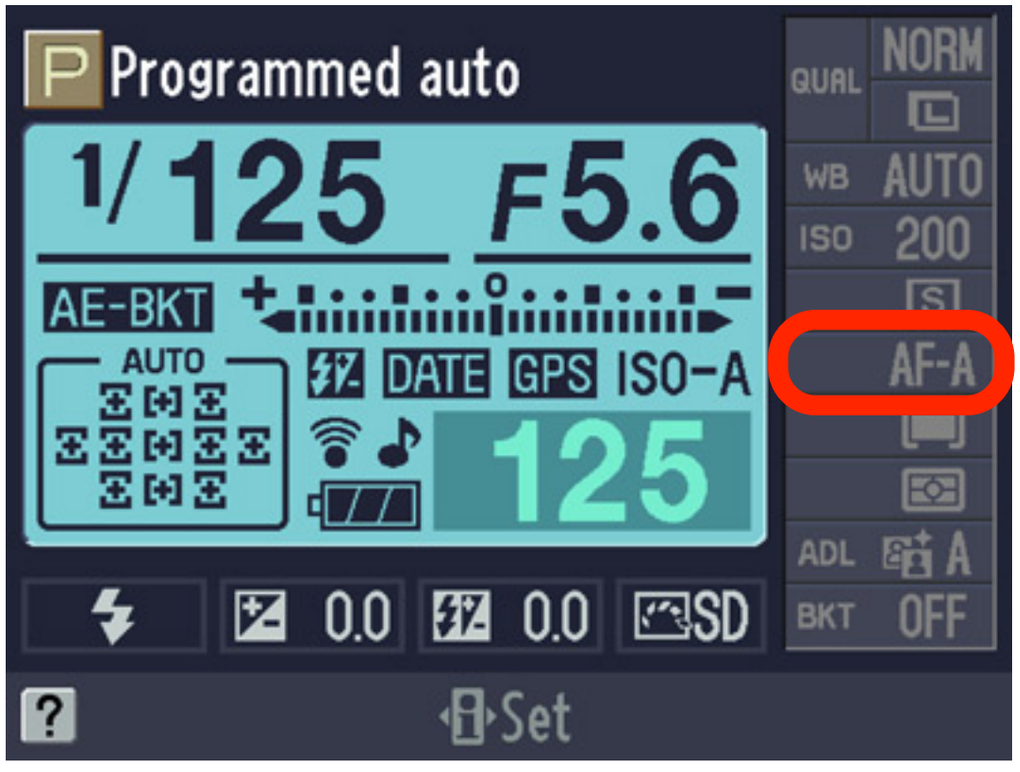
AF-A (default setting) : camera automatically selects single-servo autofocus when subject is stationary, continuous-servo autofocus when subject is moving. Shutter can only be release if camera is able to focus.

AF-S For Stationary subjects. Focus locks when the shutter-release button is pressed halfway. Shutter can only be release when in-focus indicator is displayed.

AF-C For moving subjects. Camera focuses continuously while the shutter-release button is pressed halfway. Photographs can be taken even when in-focus indicator is not displayed.

Autofocus (AF) Modes (Nikon)

AF-A - auto select
AF-S - single servo AF
AF-C - continuous servo AF



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AF-A (default setting) : camera automatically selects single-servo autofocus when subject is stationary, continuous-servo autofocus when subject is moving. Shutter can only be release if camera is able to focus.

AF-S For Stationary subjects. Focus locks when the shutter-release button is pressed halfway. Shutter can only be release when in-focus indicator is displayed.

AF-C For moving subjects. Camera focuses continuously while the shutter-release button is pressed halfway. Photographs can be taken even when in-focus indicator is not displayed.

Autofocus (AF) Modes (Canon)

One-Shot AF - still subjects
AI Servo AF - moving subjects
AI Focus AF - auto switching between modes

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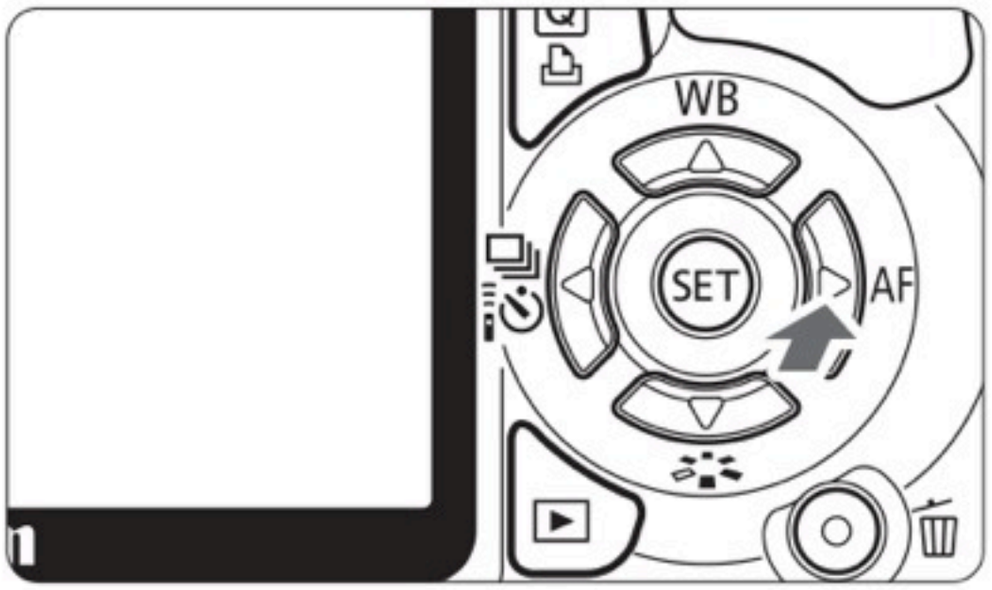
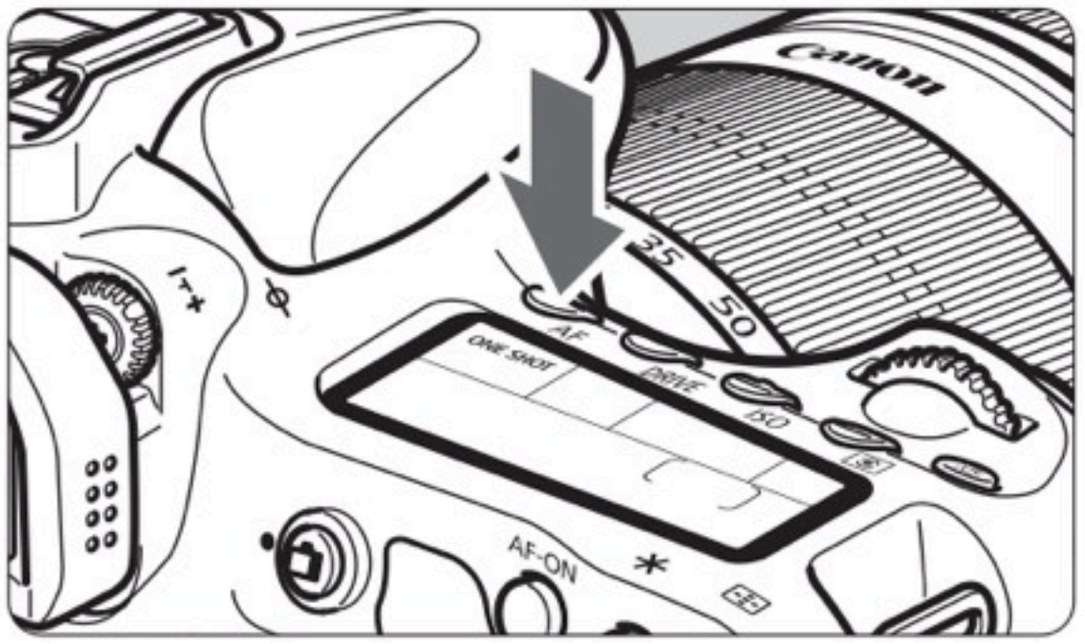
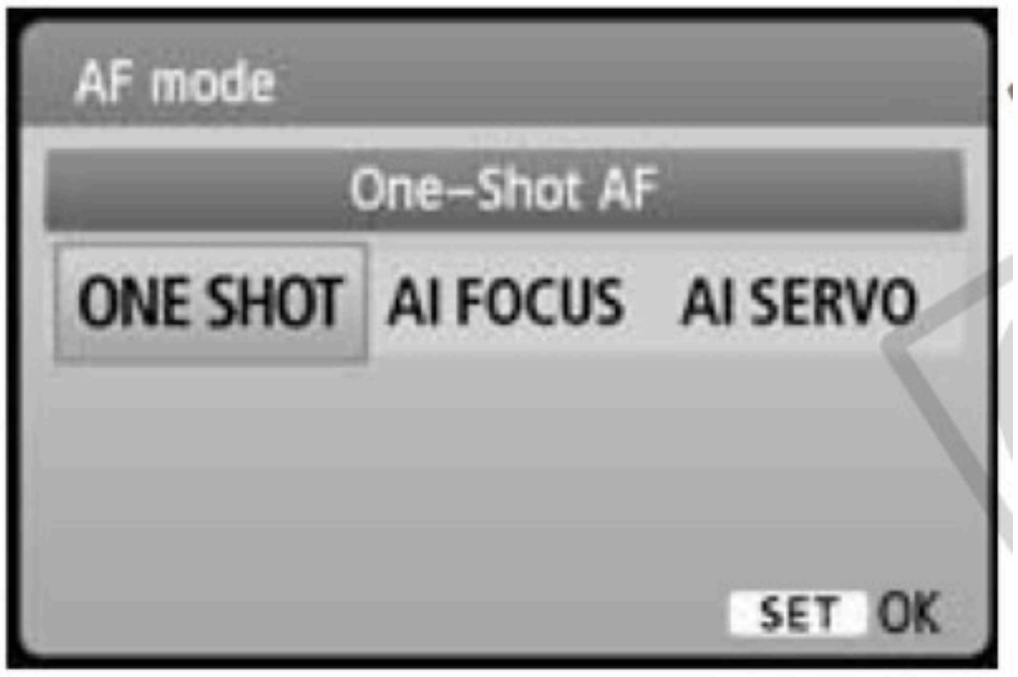
One-shot AF: When you press the shutter button halfway, the camera will focus only once.

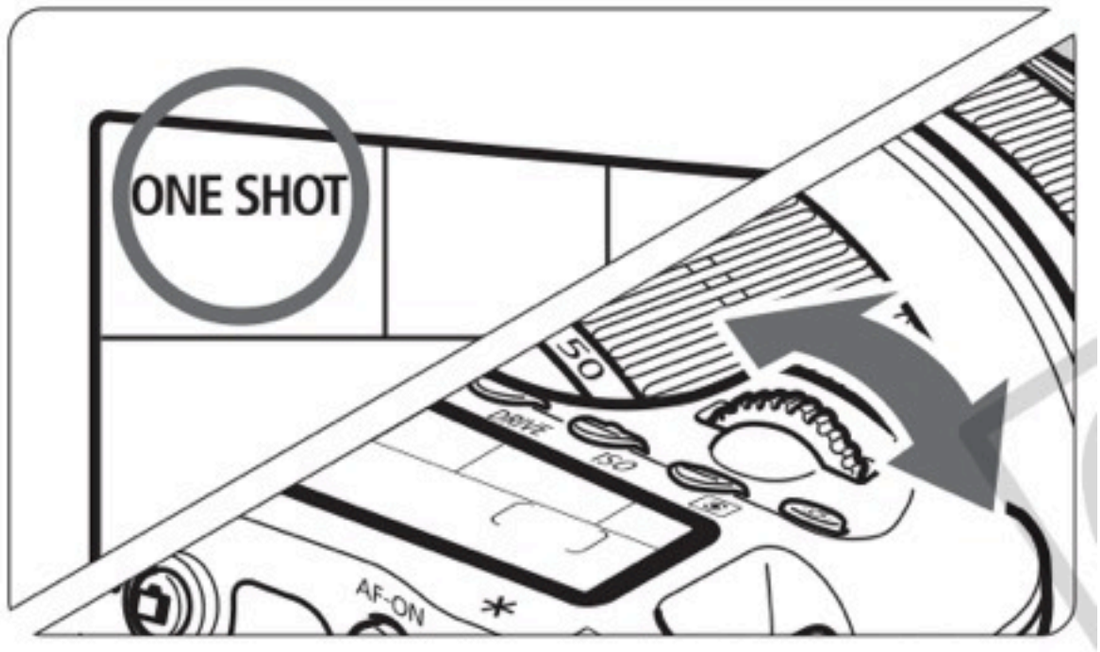
AI Servo AF. Focus is done continuously.

AI Focus AF Camera decides when to switch modes by tracking the moving subject.







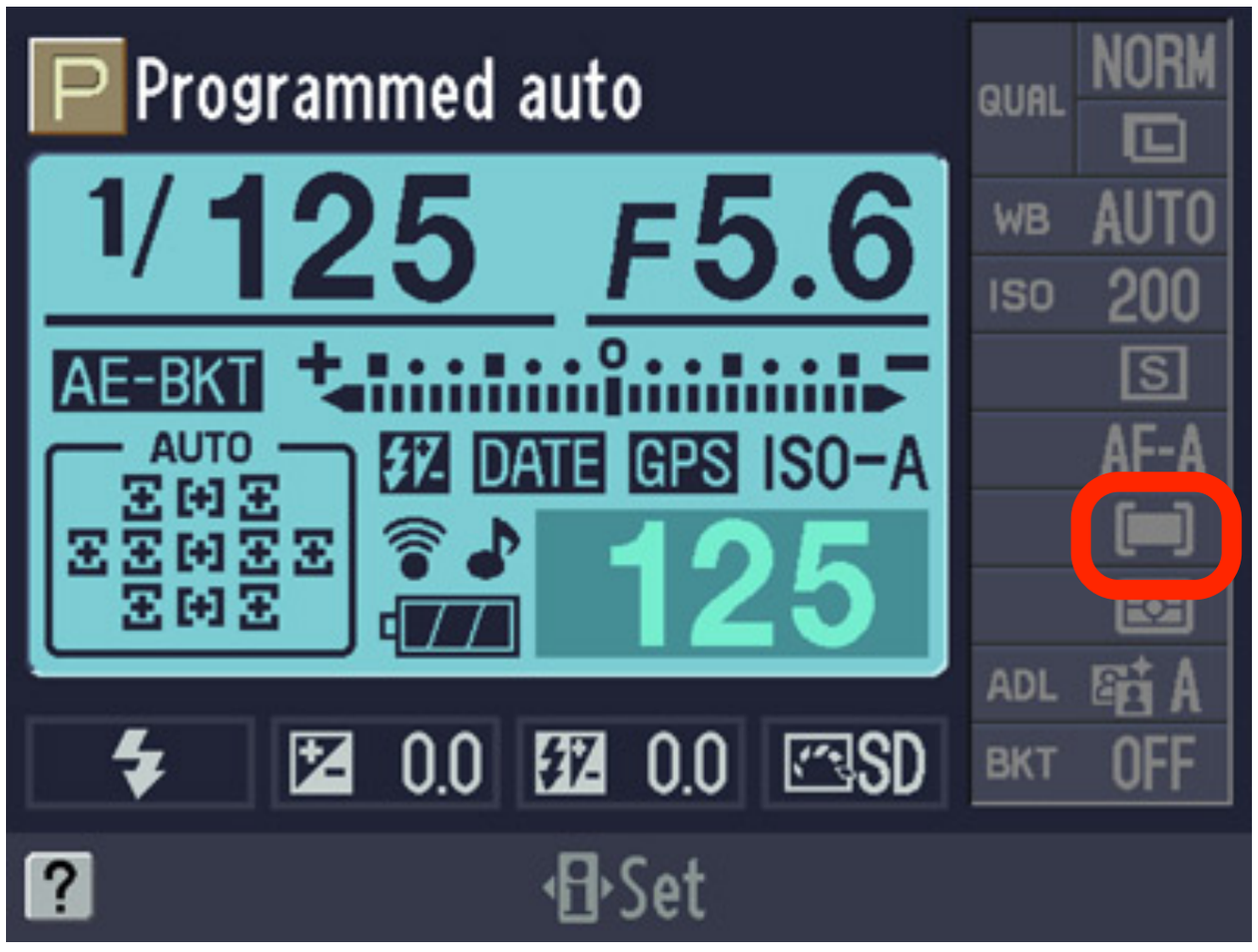


entry-level

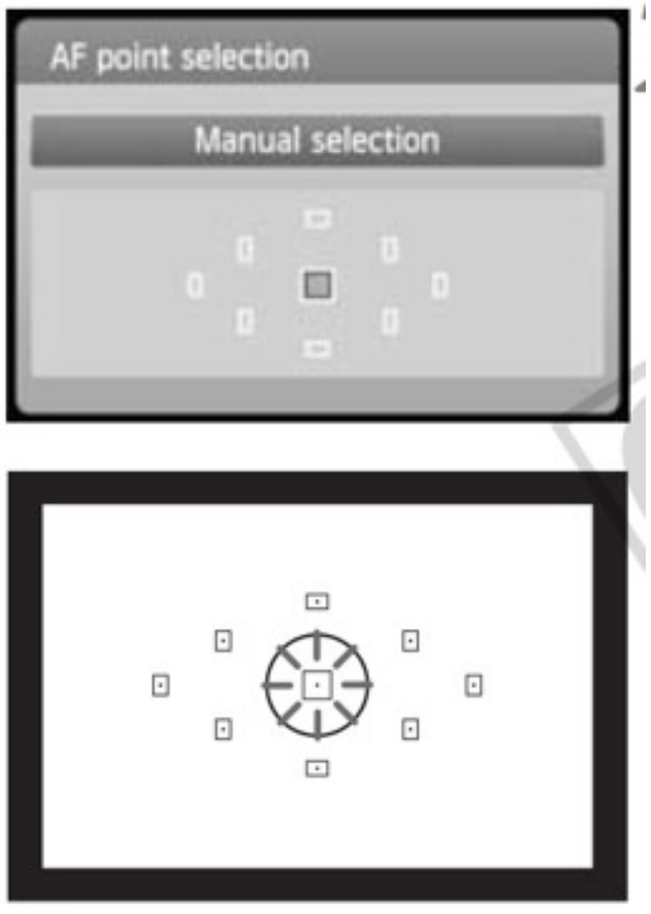
mid-level +

Selecting the AF Point

Nikon



Canon



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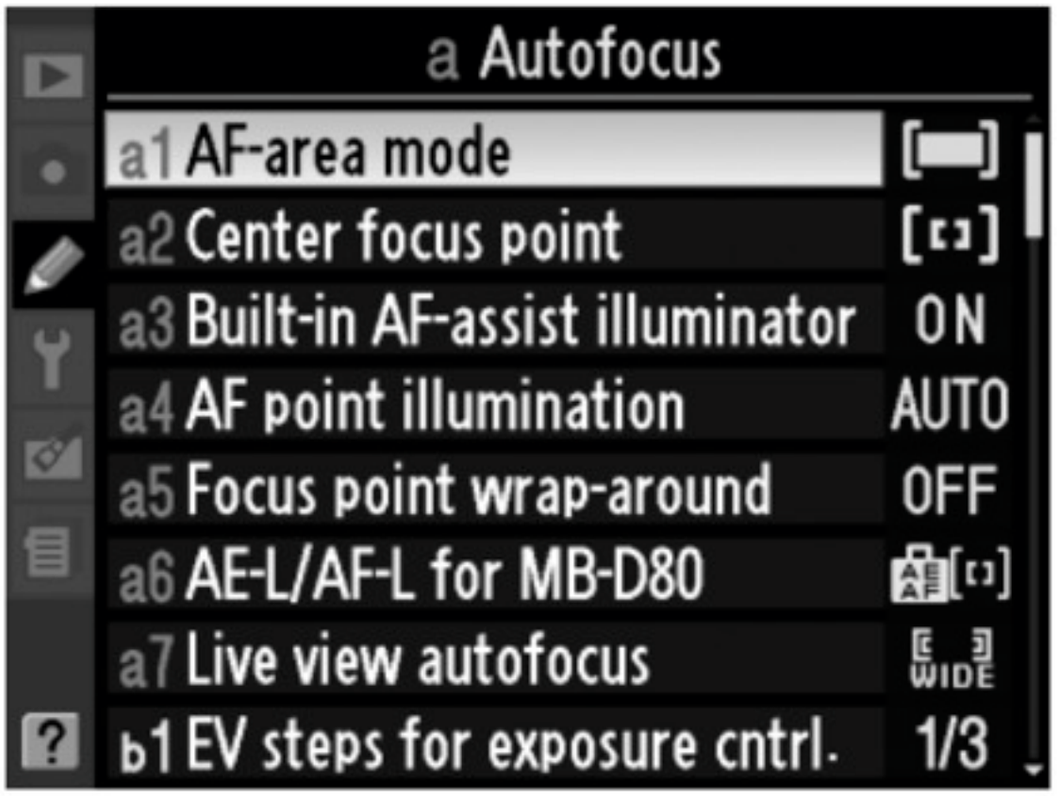
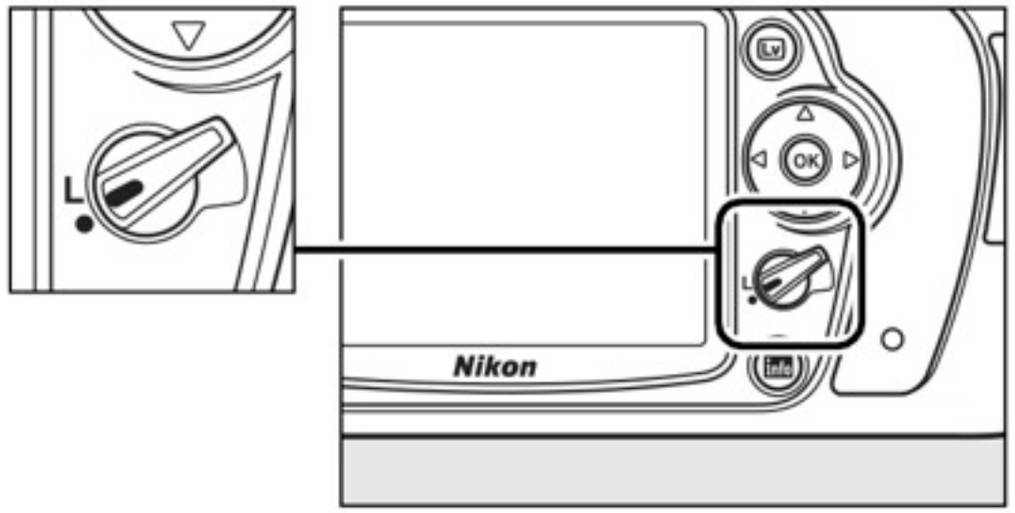
entry level

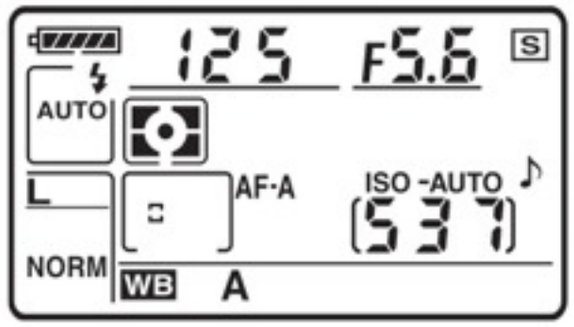
Canon, you can also look through the viewfinder and select the AF point by turning the dial until the desired AF point lights in red.
<set> toggles the AF point selection between the center AF point and automatic AF point selection

Nikon mid-level +



Focus selector lock





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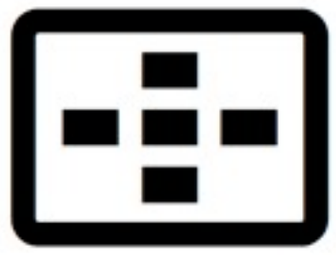
Select

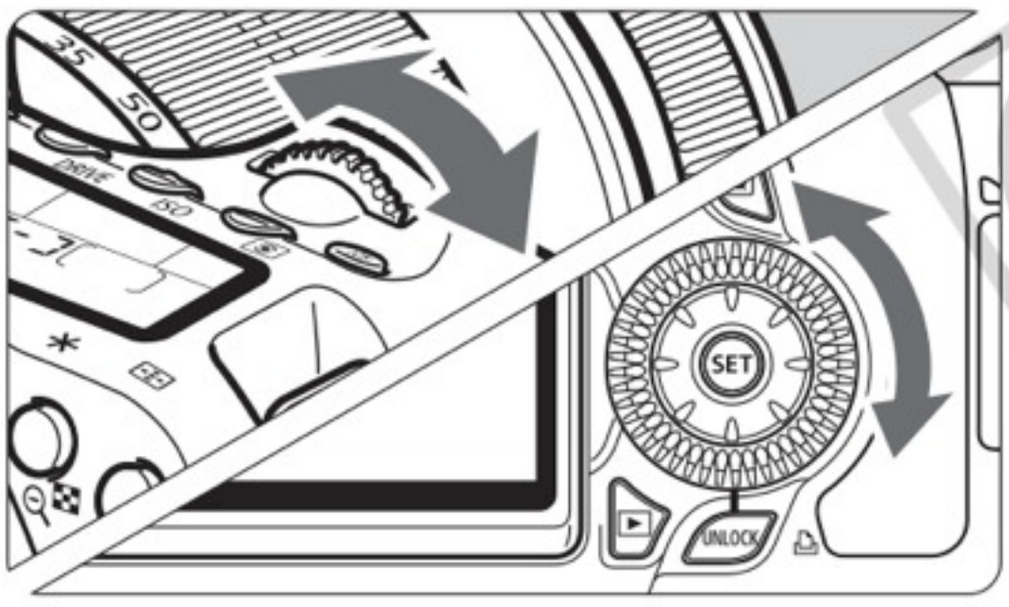
Single Point
Dynamic Area
3D Tracking (11 points)

to enable

Canon mid-level +

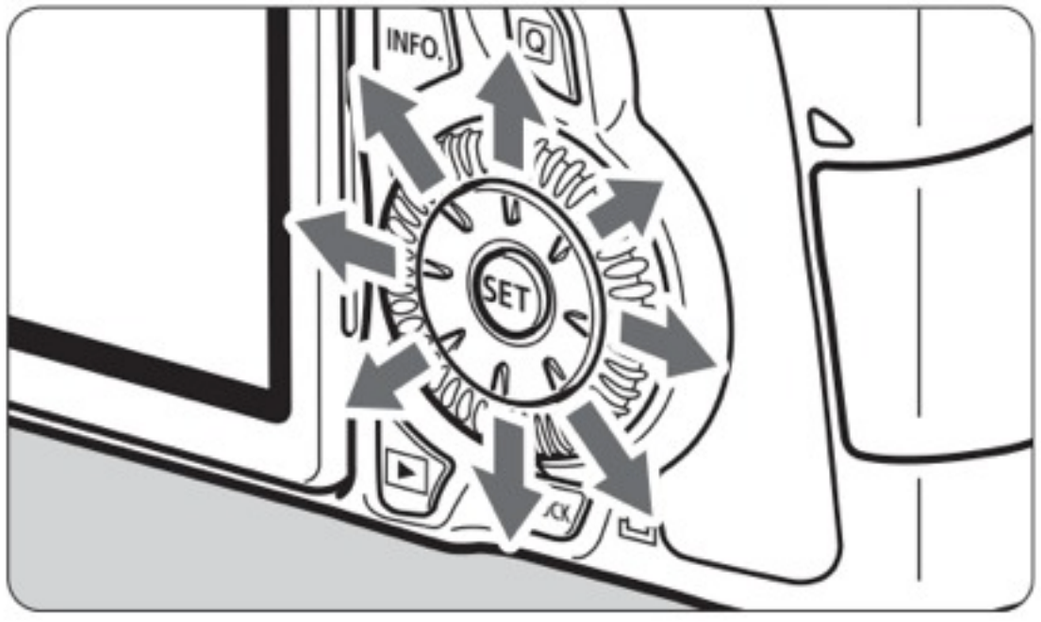


Selecting with the Dial



or

Multi controller



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<set> toggles selection between center and auto AF point

that icon when pressed shows the selected AF point in the screen if all of them light up then auto is selected.

S (Tv) - shooting mode

A (Av) - shooting mode

The “kit” lens & manual focusing.

Image Quality
RAW vs. JPEG vs. TIFF

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Nikon RAW = .NEF

Canon RAW = .CR2

Advanced topics

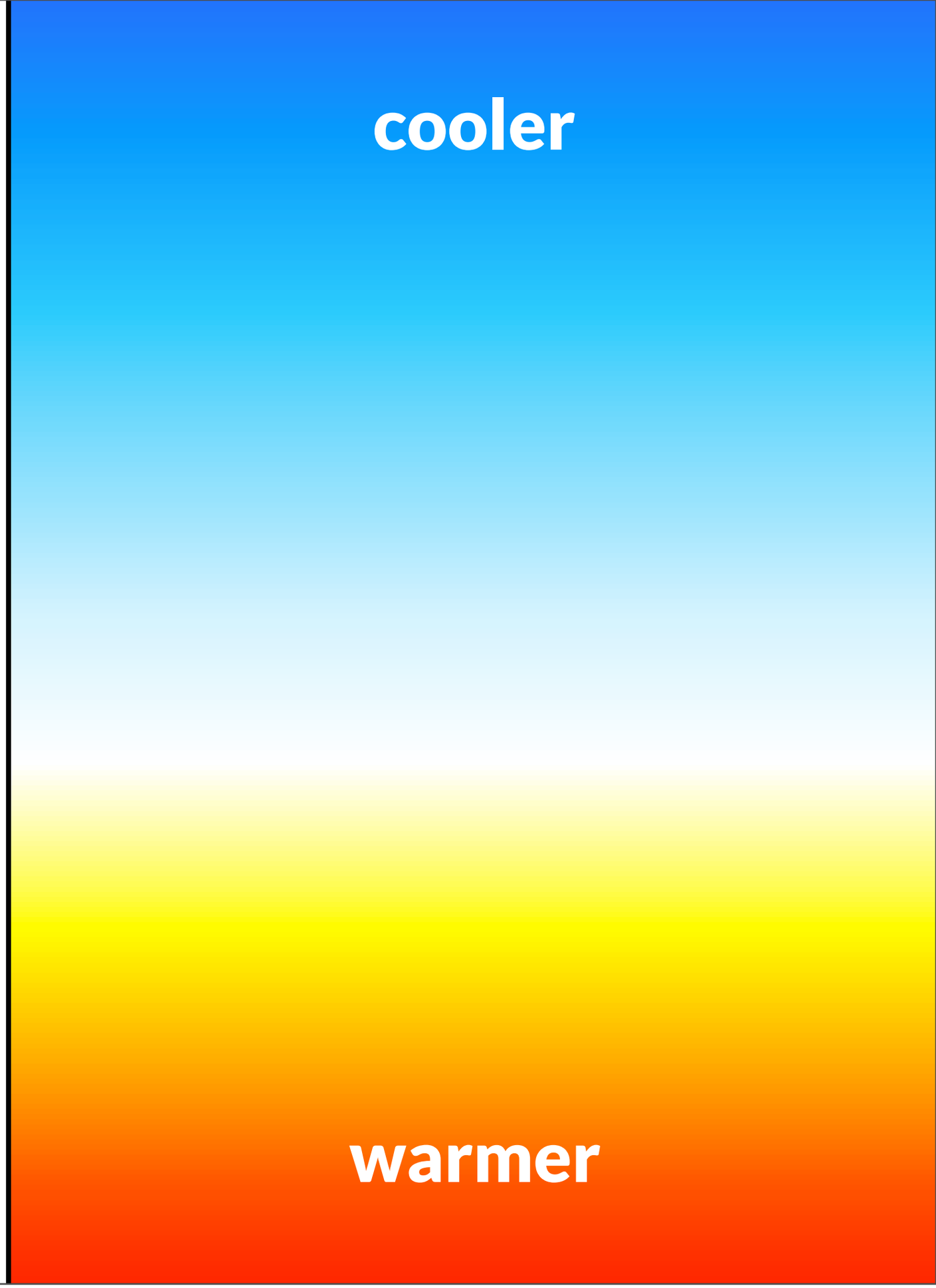
Color Temperature (K) & White Balance

Monday, September 19, 2011

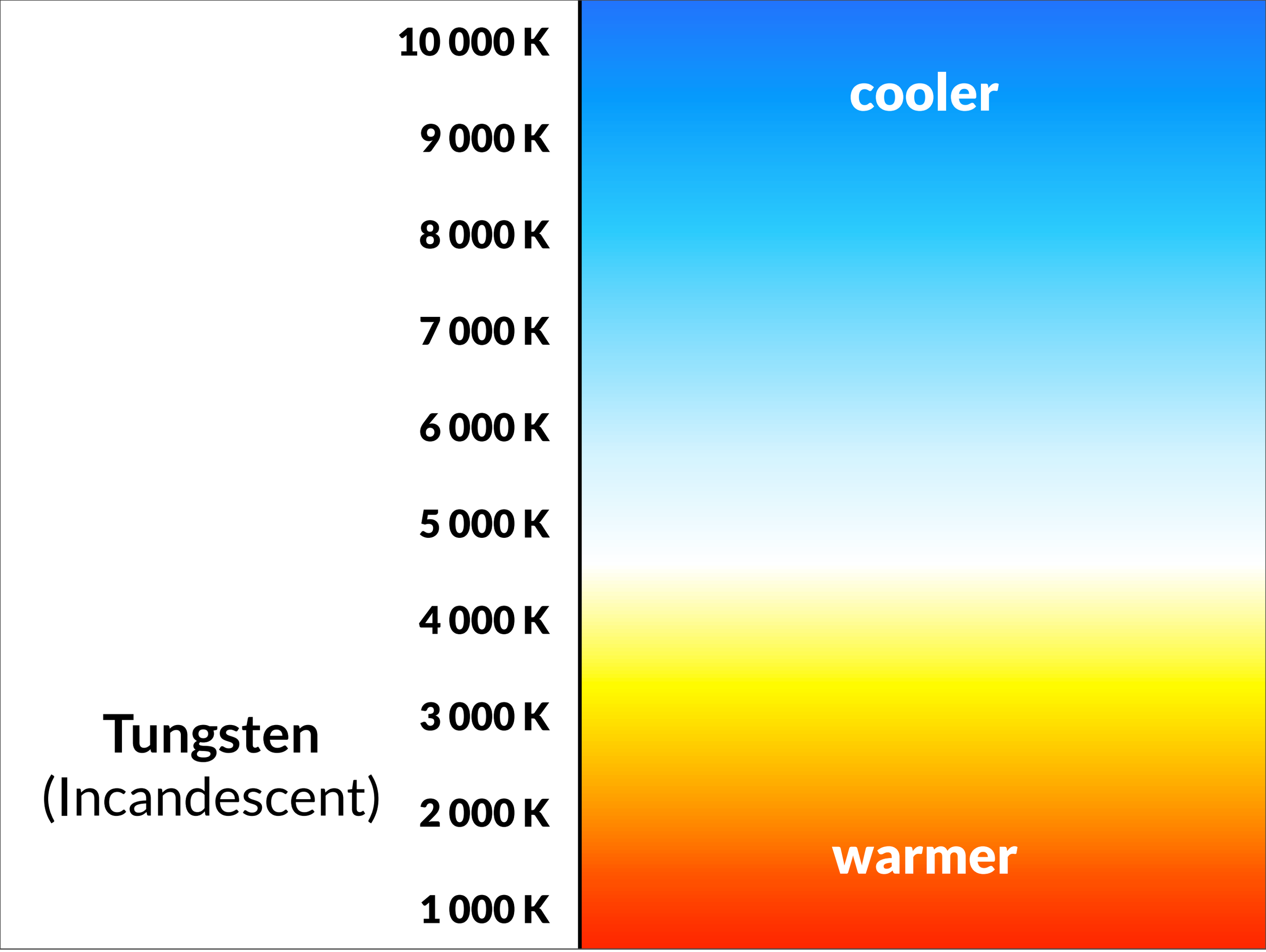
When we think of color temperature, we first look to all the various color temperatures that can be found naturally.

By definition, color temperature of a light source is the temperature of an ideal black-body radiator that radiates light of comparable hue to that of the light source. Hence, color temperature is stated in the unit of kelvins.

Blue Sky	**10 000 K**
	9 000 K
Partly Cloudy	**8 000 K**
	7 000 K
Overcast / Haze	**6 000 K**
Noon Daylight Direct Sun	**5 000 K**
	4 000 K
Late Sunrise Early Sunset	**3 000 K**
Early Sunrise Late Sunset	**2 000 K**
	1 000 K



camera vs. eye



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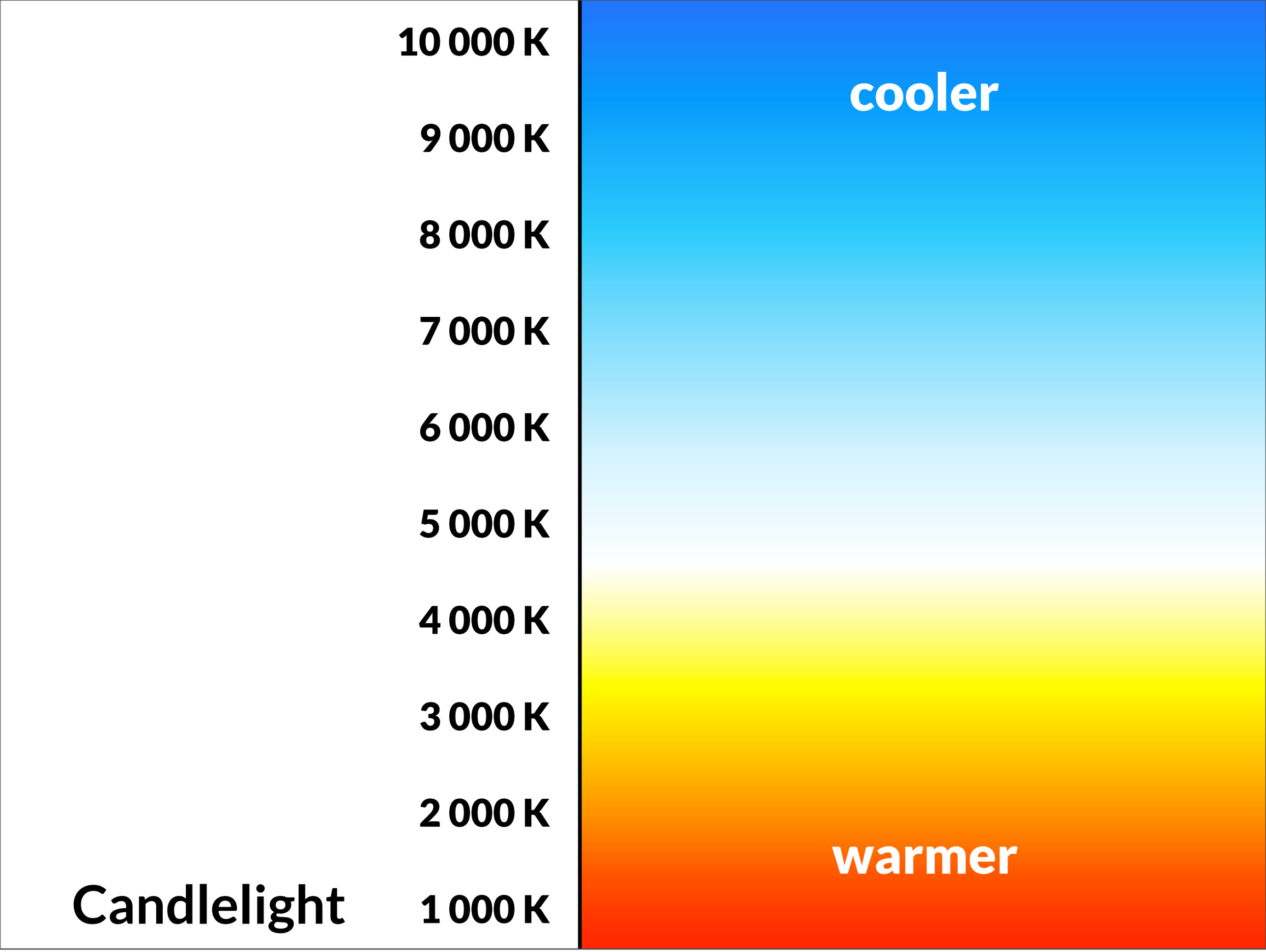
Tungsten lighting (more commonly known as incandescent lighting)...is lighting based on heat. It puts of a very warm yellowish glow, just like a late sunrise or early sunset. It's very cosy. We barely notice this glow. However, when you point a camera that's improperly white balanced for the scene, you may get a very unwanted yellowish glow.

Bulbs based on heat (tungsten lamps) – incandescent light – have for a long time been (and still is) the most common source of light in our homes. We are so accustomed to the warm yellowish light created by these lamps that we perceive it as fairly white. But our camera records the yellow color cast as it is. This is sometimes desirable, as it creates a warm, cosy effect. But more often this effect is not what we want, forcing us to adjust the white balance accordingly. As this kind of light is based on heat, the colortemperature in the Kelvin temperature scale is pretty low; between 2500K-2900K (not unlike sunlight at sunrise and sunset).



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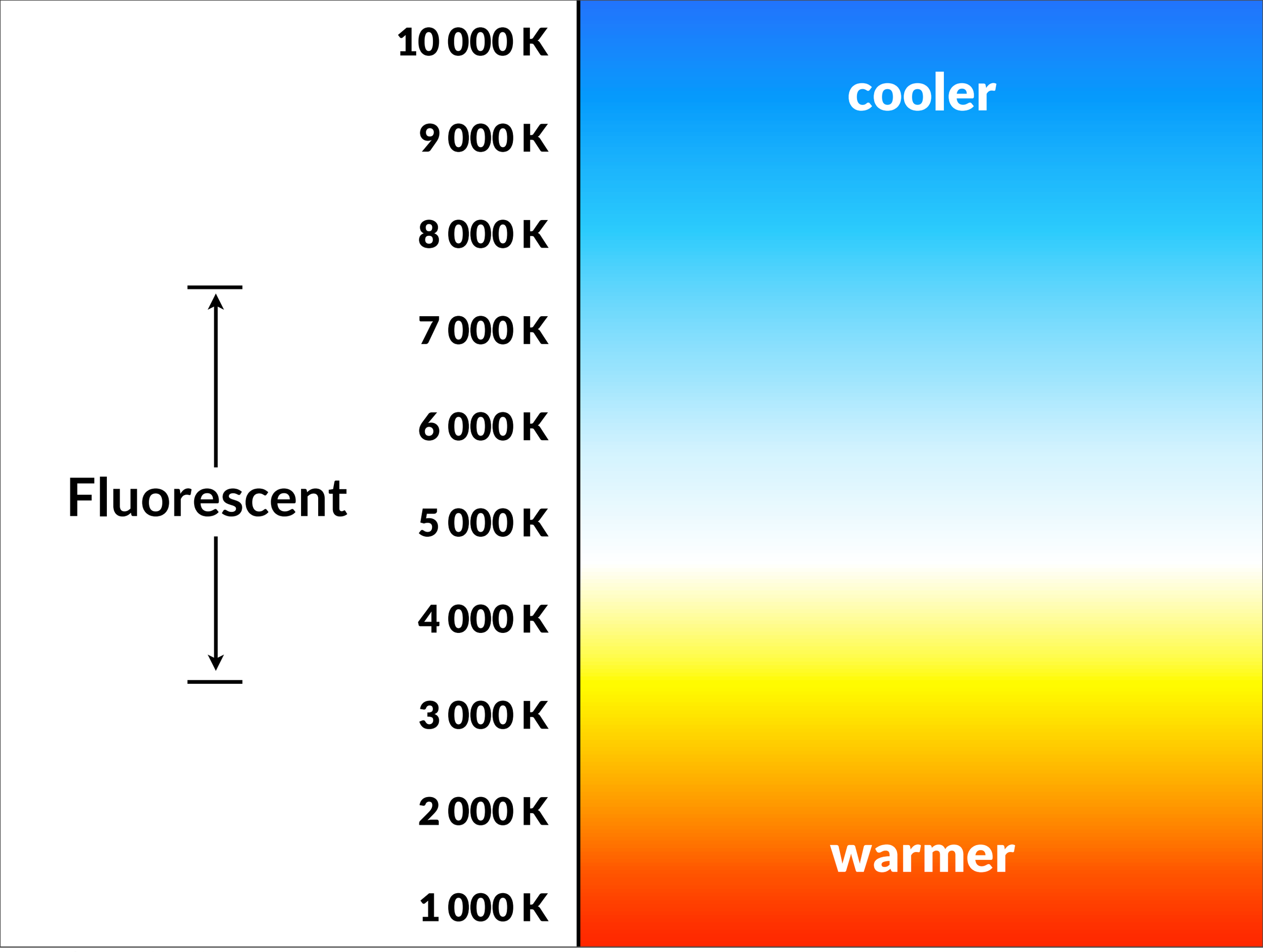
Even warmer is the light emissions from flames, like candlelight or a fireplace. The white balance setting for tungsten usually works well with candle-lit interiors, but as the temperature of candlelight is just below 2000K, even more adjustment may be warranted.



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Older Fluorescent lighting has a sort of green tint to it. Newer fluorescent lights now can span a whole range of different color temperatures.

10 000 K

9 000 K

8 000 K

7 000 K

6 000 K

5 000 K

4 000 K

Sodium Lights
(street lamps)

3 000 K

2 000 K

1 000 K

cooler

warmer

White balance

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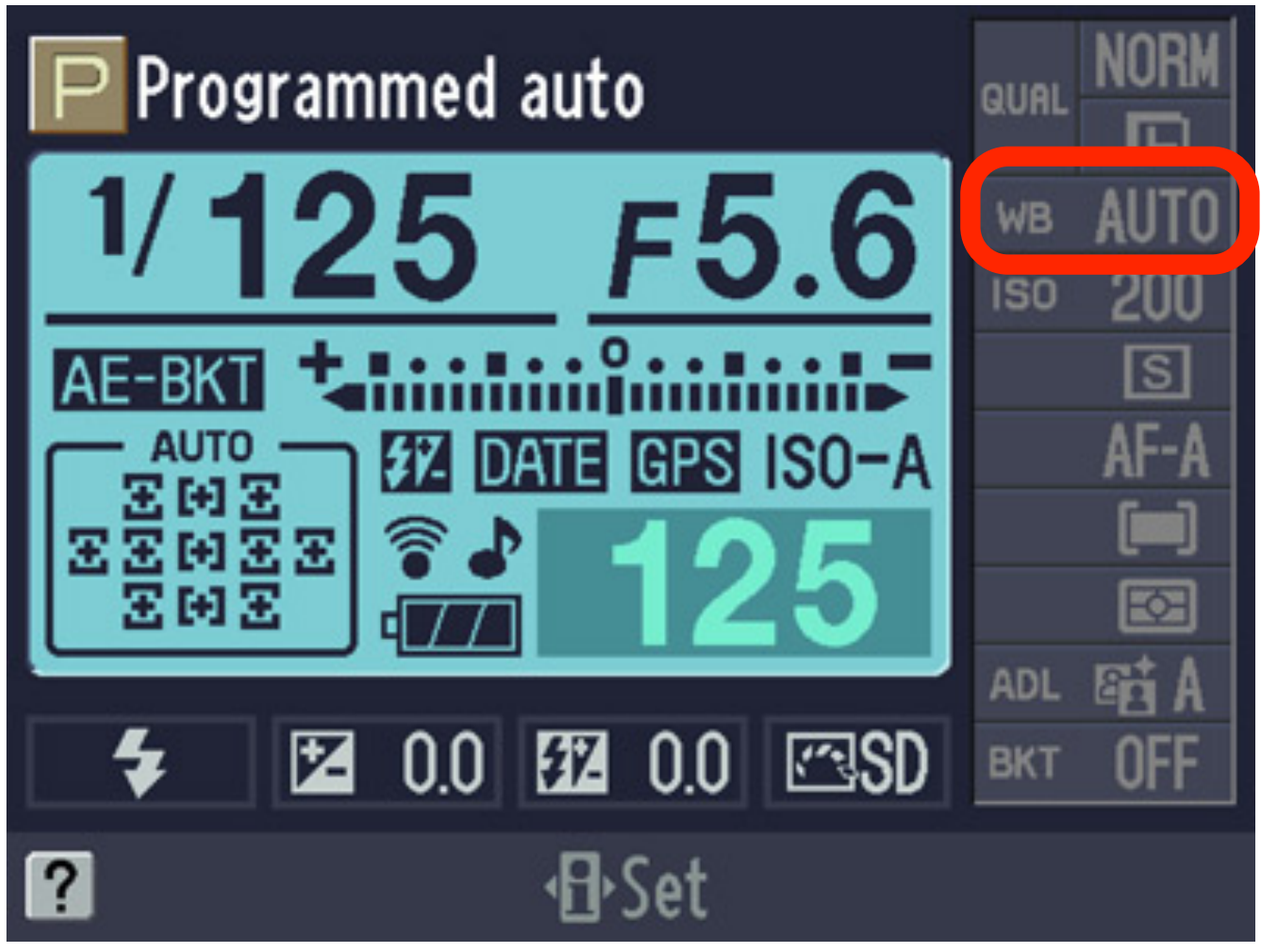
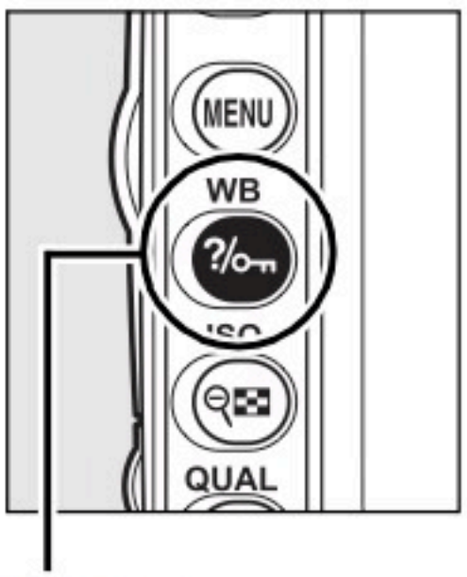
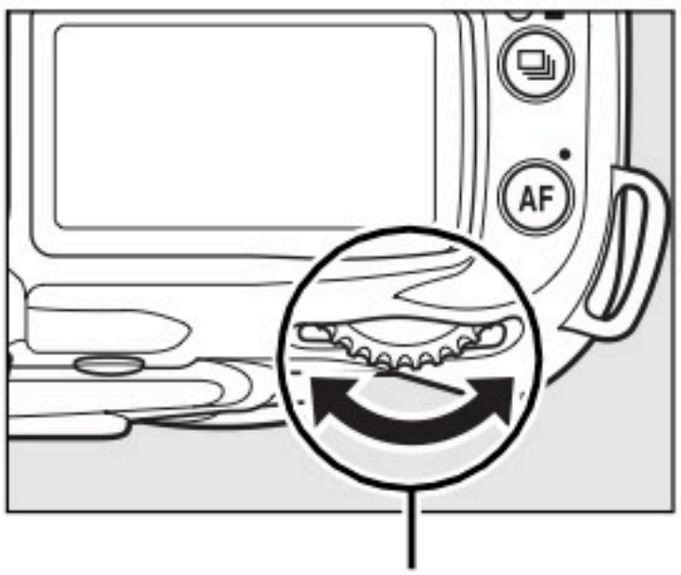
To the human eye, a white object looks white regardless of the type of lighting. With a digital camera, the color temperature is adjusted with software to make the white areas look white. This adjustment serves as the basis for the color correction. The result is natural-looking colors in the pictures.

let’s change our white balance!

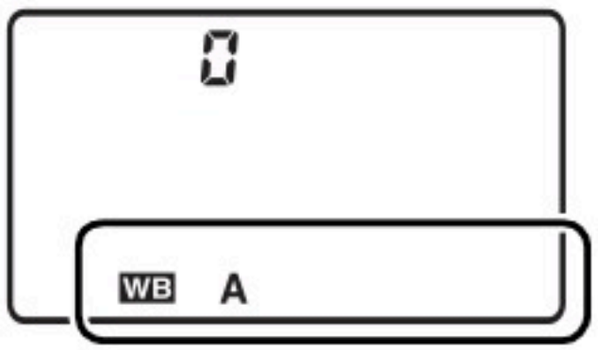




WB *button*



Main command dial



Control panel

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Nikon

TOP (entry)

Bottom (midlevel)

1/125
F5.6
ISO800
M
-2..1..0..1..+2
S
AWB
WB
+/-
RAW+L
MF
Q
219

Option		Color temp. (K)	Description
A	**Auto** (default)	3,500–8,000*	Camera sets white balance automatically; recommended in most situations. For best results, use type G or D lens. If built-in or optional flash is used, white balance reflects conditions in effect when flash fires.
	Incandescent	3,000*	Use under incandescent lighting.
	Fluorescent		Use with the following seven light sources:
	Sodium-vapor lamps	2,700*	Use under sodium-vapor lighting (found in sports venues).
	Warm-white fluorescent	3,000*	Use under warm-white fluorescent lights.
	White fluorescent	3,700*	Use under white fluorescent lights.
	Cool-white fluorescent (default for **Fluorescent**)	4,200*	Use under cool-white fluorescent lights.
	Day white fluorescent	5,000*	Use under daylight white fluorescent lights.
	Daylight fluorescent	6,500*	Use under daylight fluorescent lights.
	High temp. mercury-vapor	7,200*	Use under high color temperature light sources (e.g. mercury-vapor lamps).
	Direct sunlight	5,200*	Use with subjects lit by direct sunlight.
	Flash	5,400*	Use with built-in or optional flash.
	Cloudy	6,000*	Use in daylight under overcast skies.
	Shade	8,000*	Use in daylight with subjects in the shade.
K	**Choose color temp.**	2,500–10,000	Choose color temperature from list of values (pg. 99).
PRE	**Preset manual**	—	Use subject, light source, or existing photograph as reference for white balance (pg. 100).

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Nikon's list of icons

Display	Mode	Color Temperature (Approx. K: Kelvin)
AWB	Auto	3000 - 7000
	Daylight	5200
	Shade	7000
	Cloudy, twilight, sunset	6000
	Tungsten light	3200
	White fluorescent light	4000
	Flash use	Automatically set*
	Custom (p.97)	2000 - 10000
K	Color temperature (p.98)	2500 - 10000

COPY

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Canon’s icons

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Depth of Field

14
BERGAMO
15
ROMA TERMINI

Depth of Field, in its most basic sense, is controlled by the size of the **aperture.**

Aperture

Think of squinting.

f/2

Aperture

Think of squinting.

f/2.8

Aperture

Think of squinting.

f/4

Aperture

Think of squinting.

f/5.6

Aperture

Think of squinting.

f/8

Aperture

Think of squinting.

f/22

(dolcepics.com)

DoF: two extremes

Narrow Depth of Field

Large aperture, small f-number (*f/1.8*).

Irving Penn

Wide Depth of Field

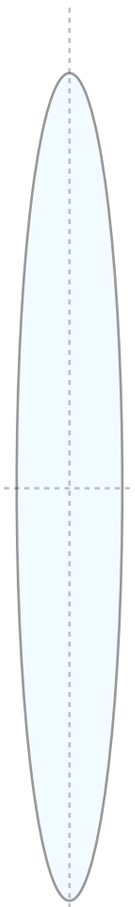
Small aperture, large f-number (*f/64*).

Ansel Adams

f/1.4 *1/60 sec*

f/16

2.5 sec



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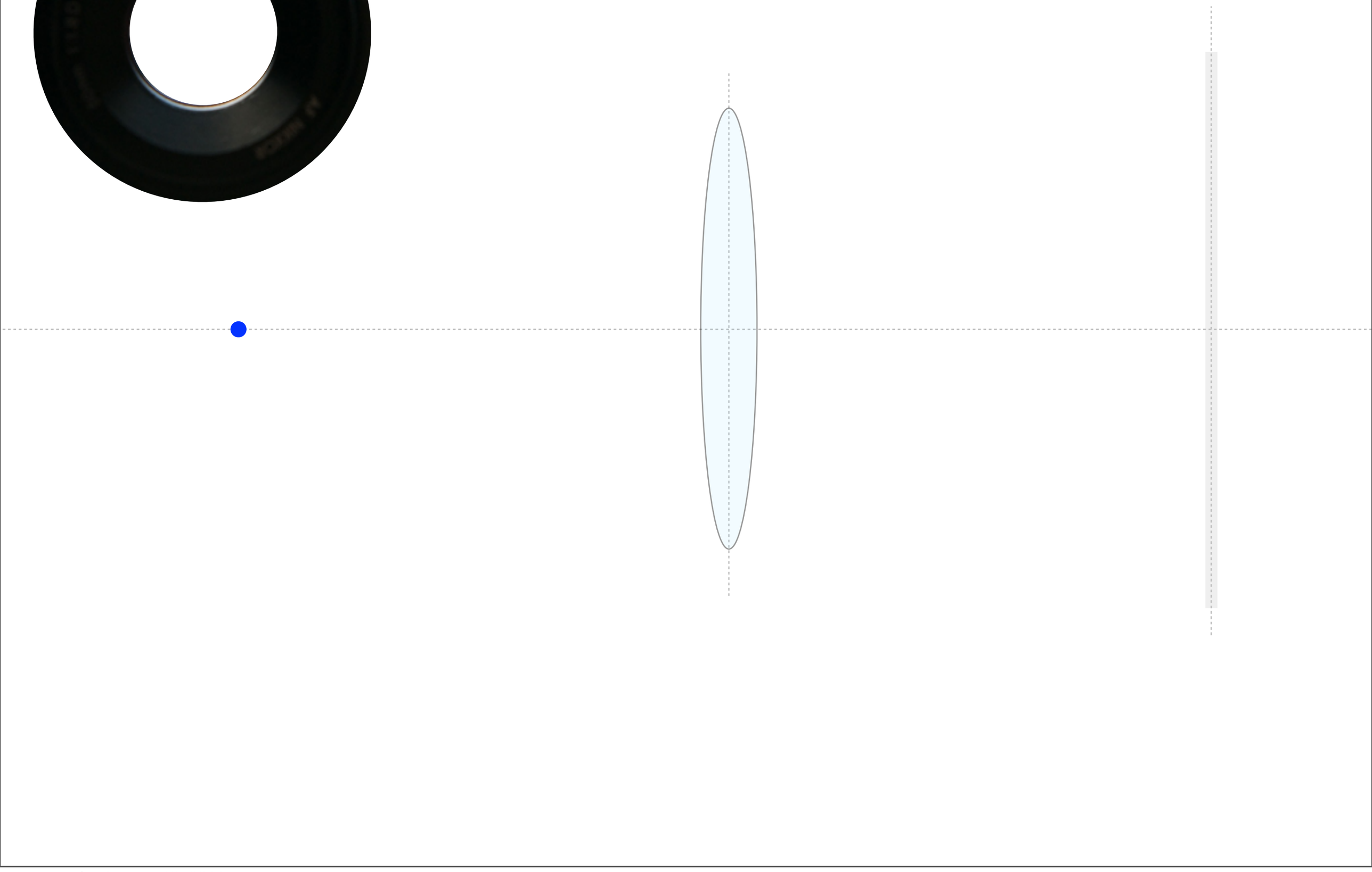
Since there is no critical point of transition, a more rigorous term called the "**circle of confusion**" is used to define how much a point needs to be blurred in order to be perceived as unsharp. When the circle of confusion becomes perceptible to our eyes, this region is said to be outside the depth of field and thus no longer "acceptably sharp." For CCD cameras, d of circle of confusion is between 0.01 and 0.005 mm.



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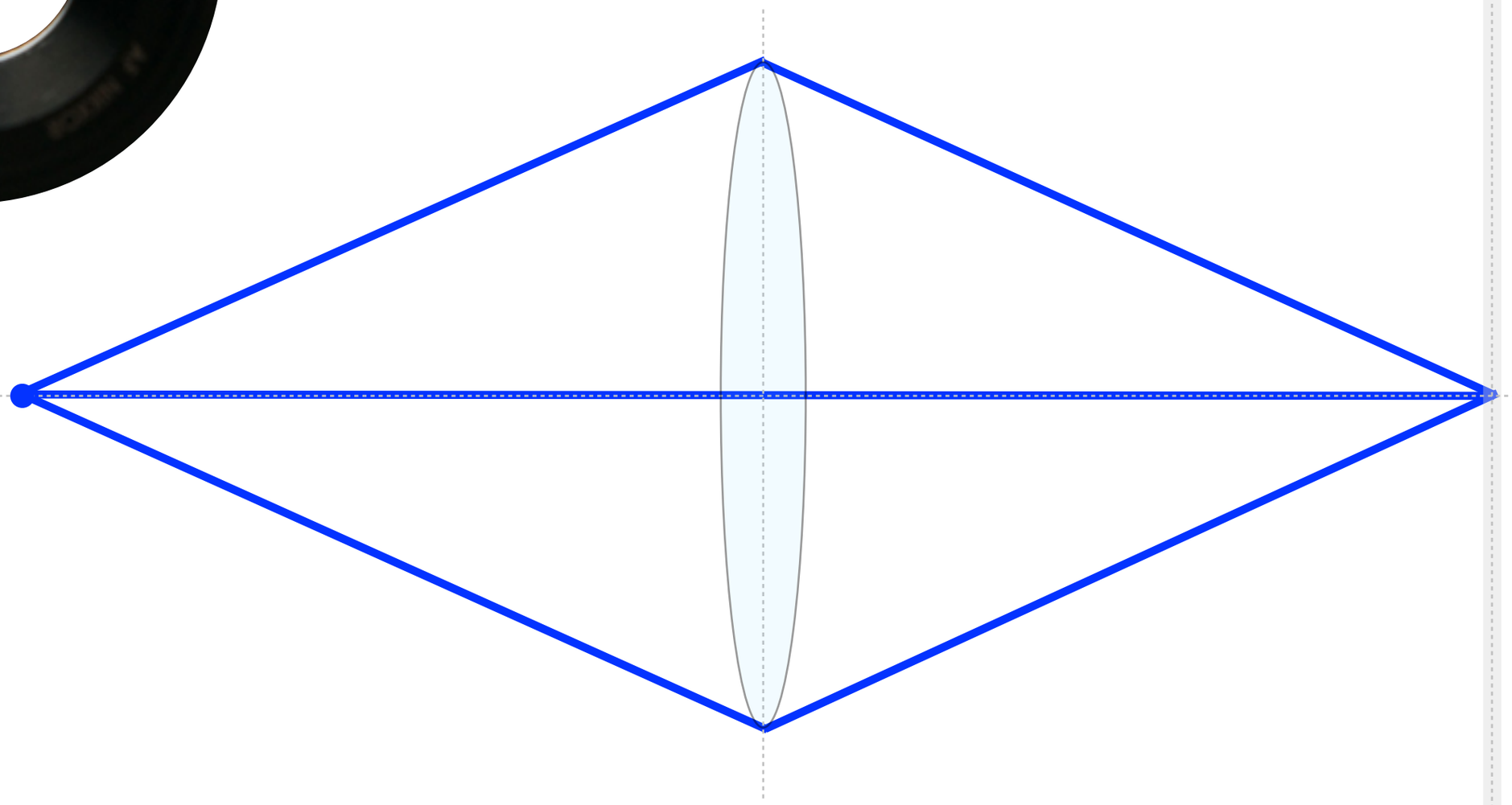

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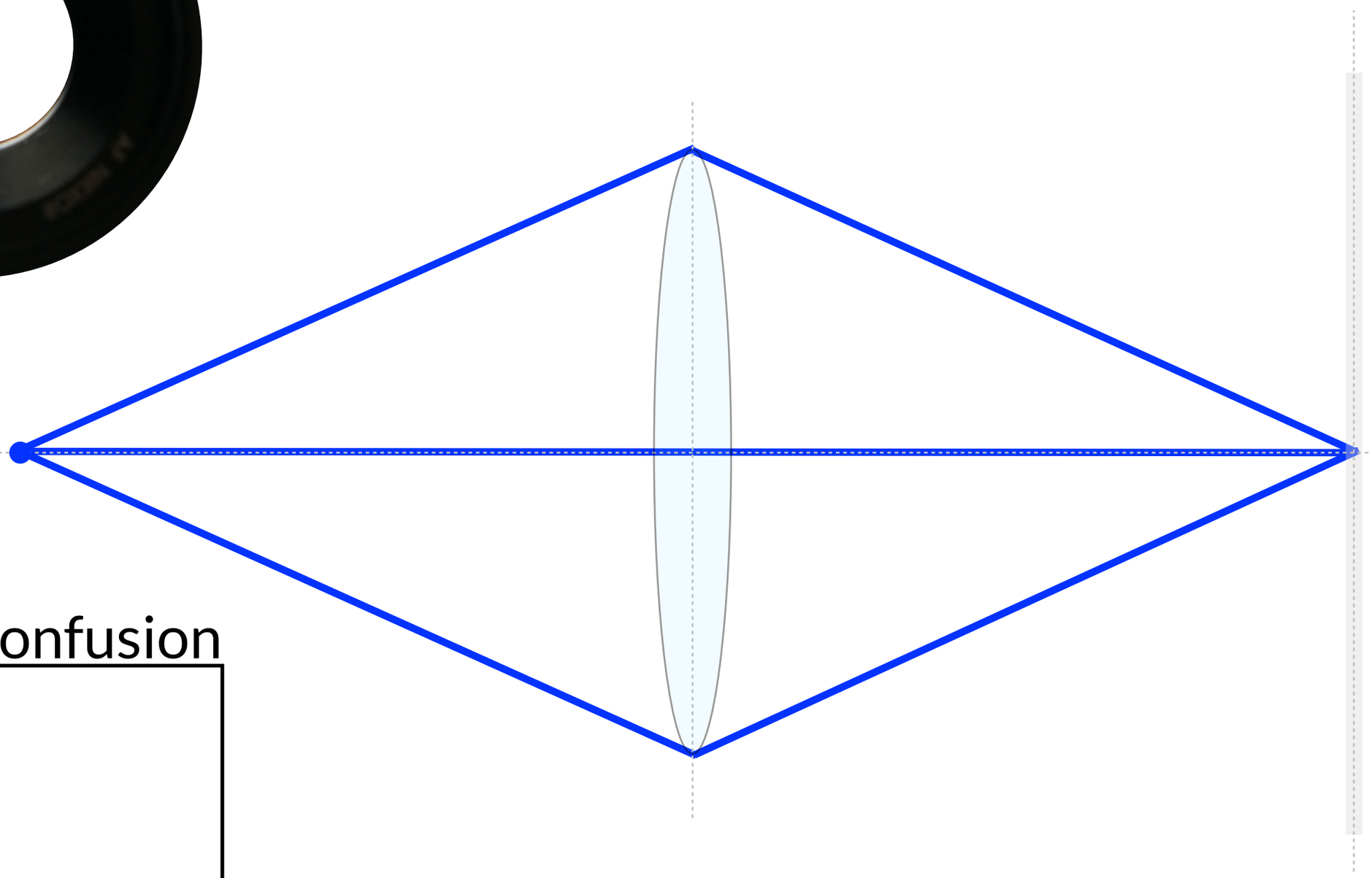
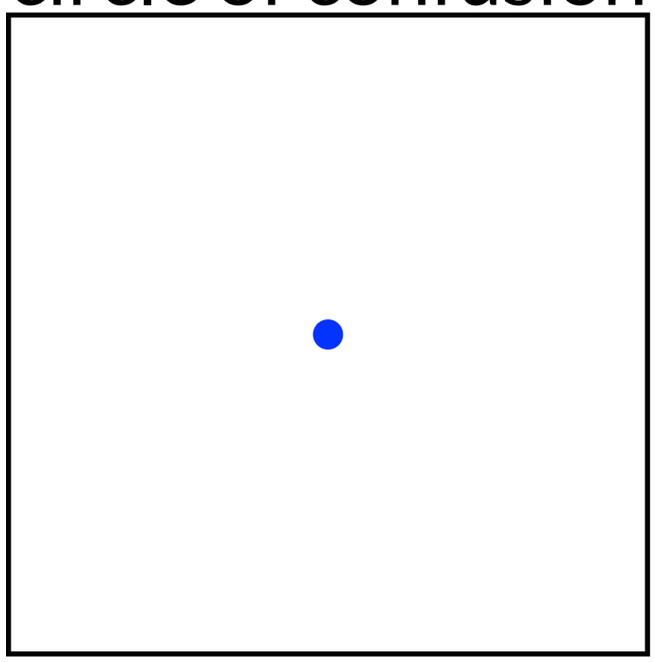


circle of confusion



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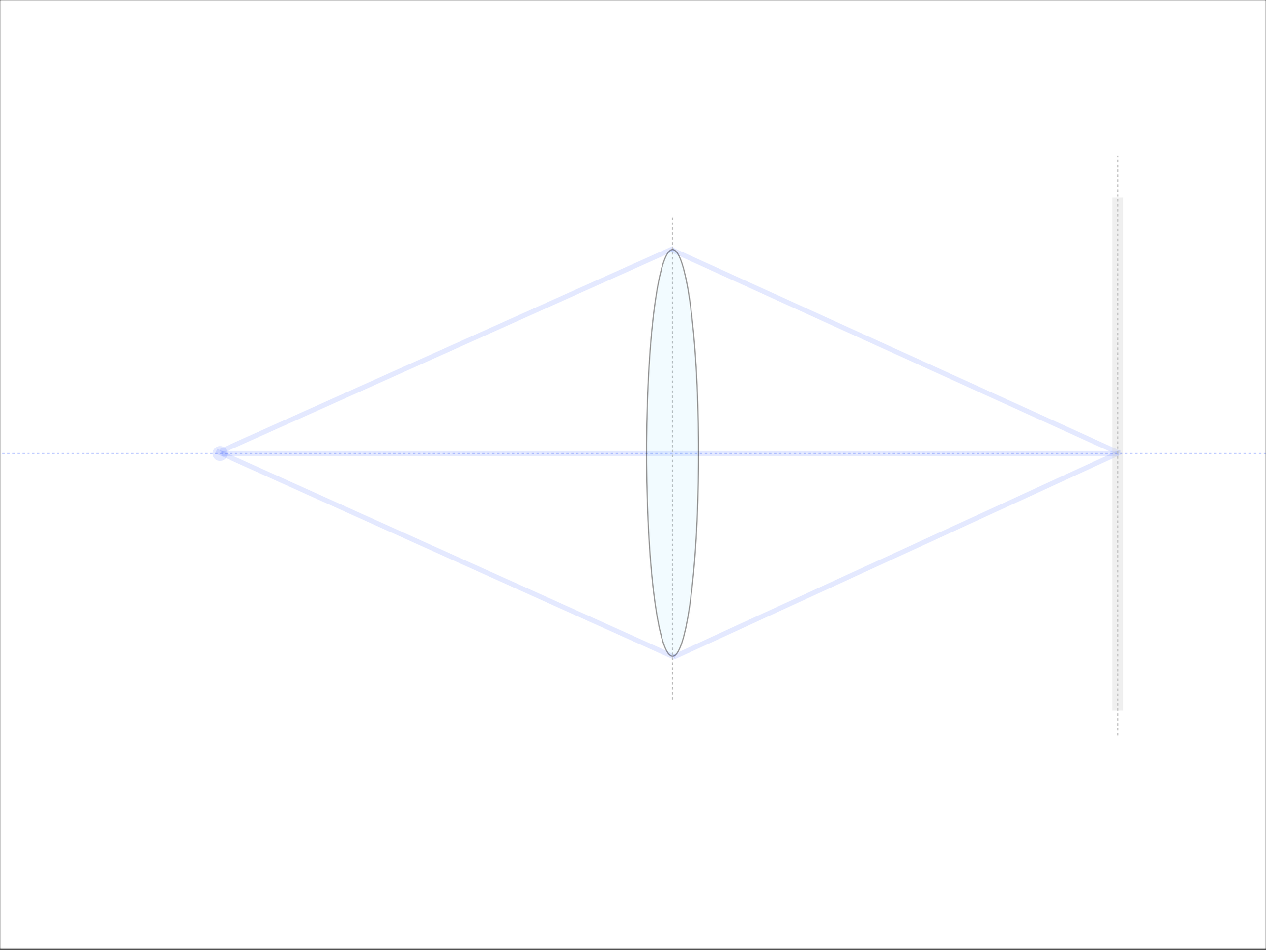

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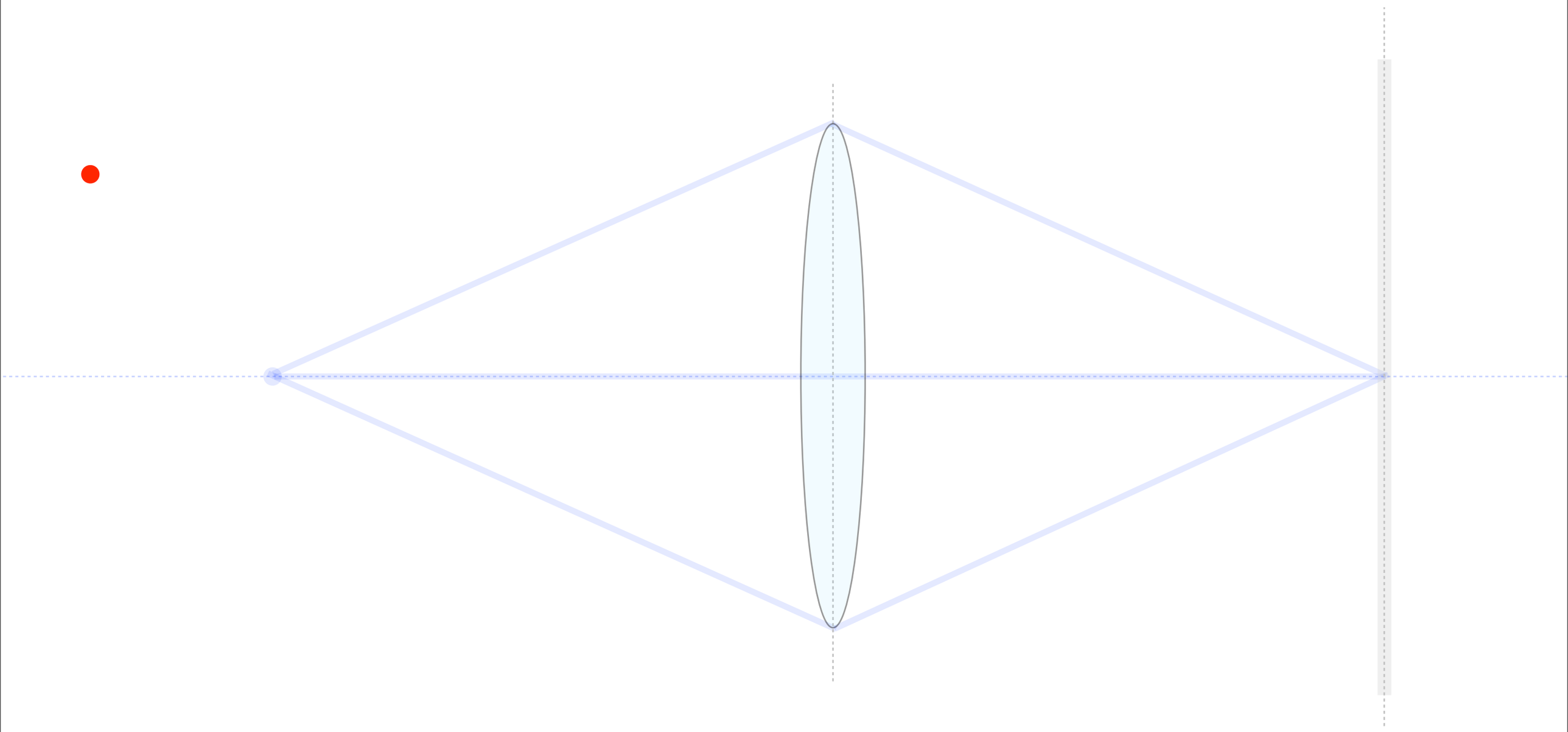

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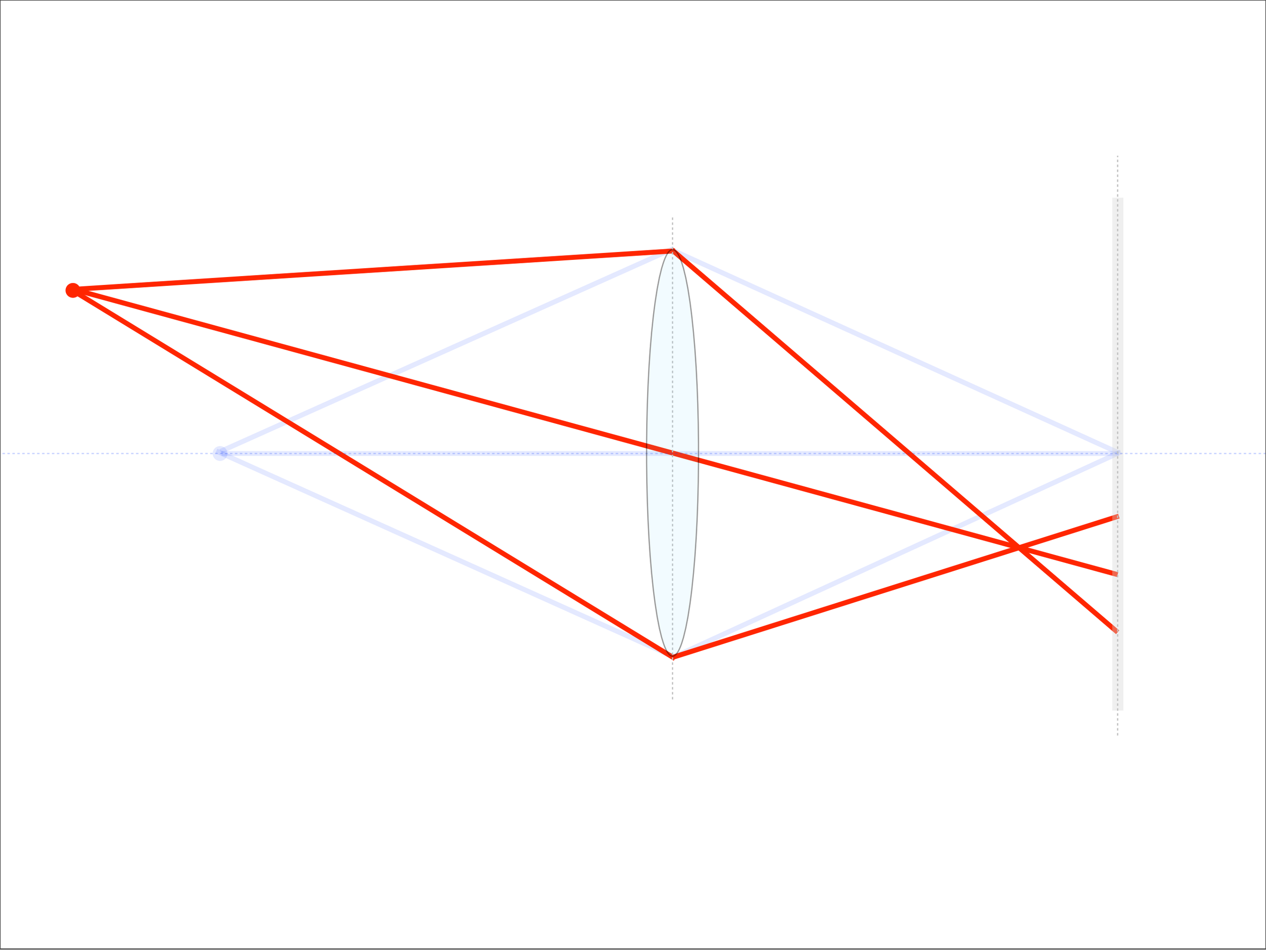

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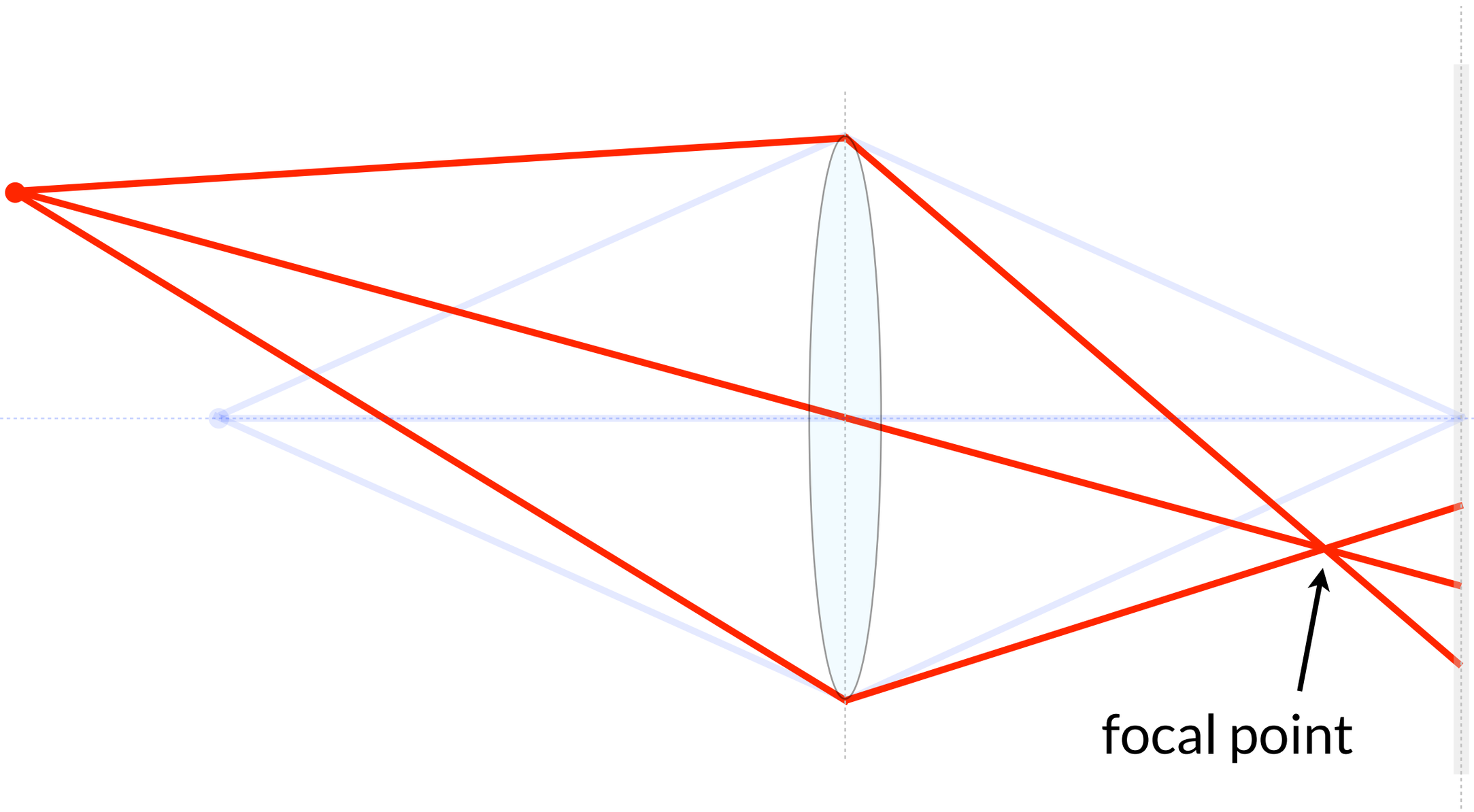

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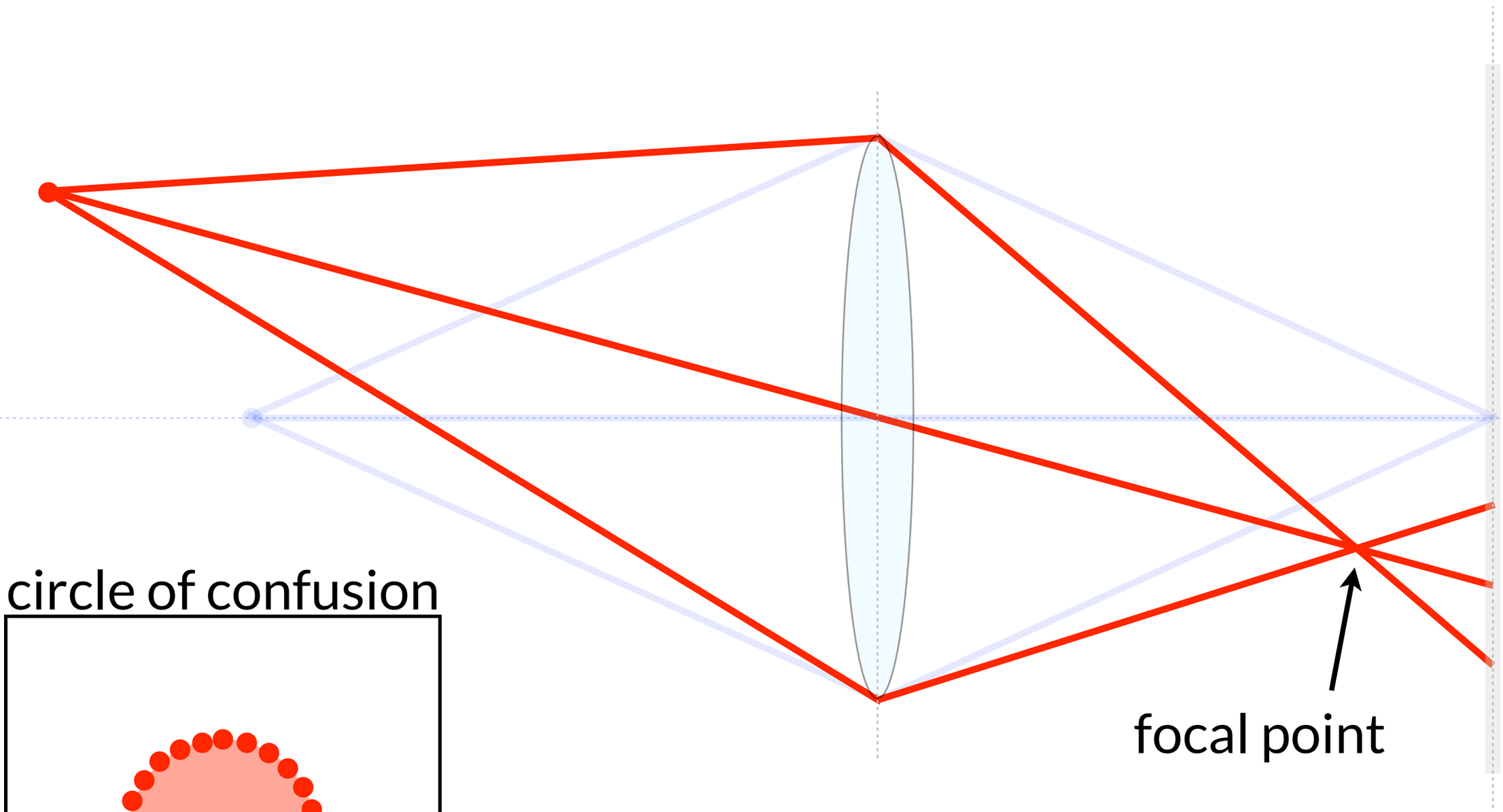

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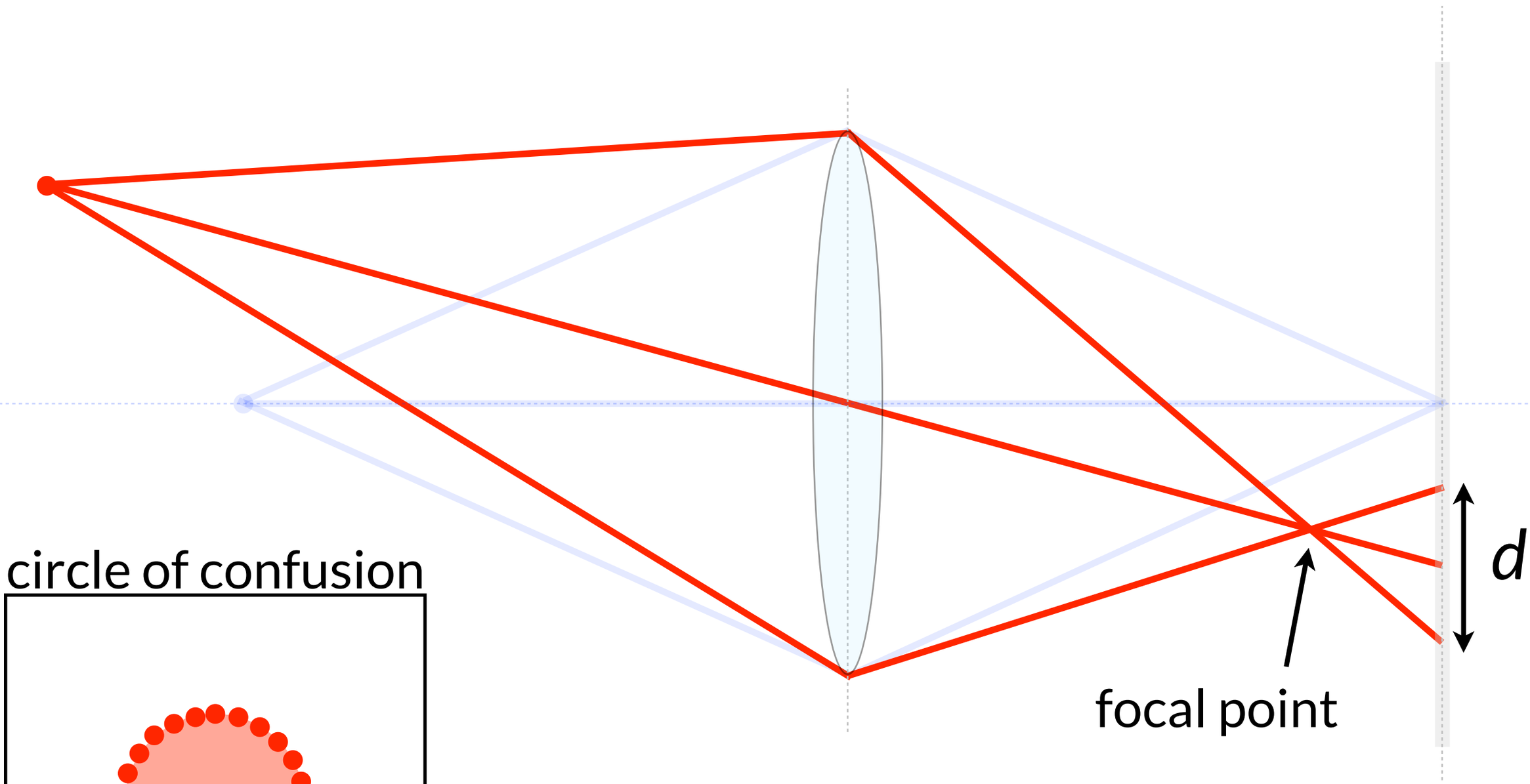

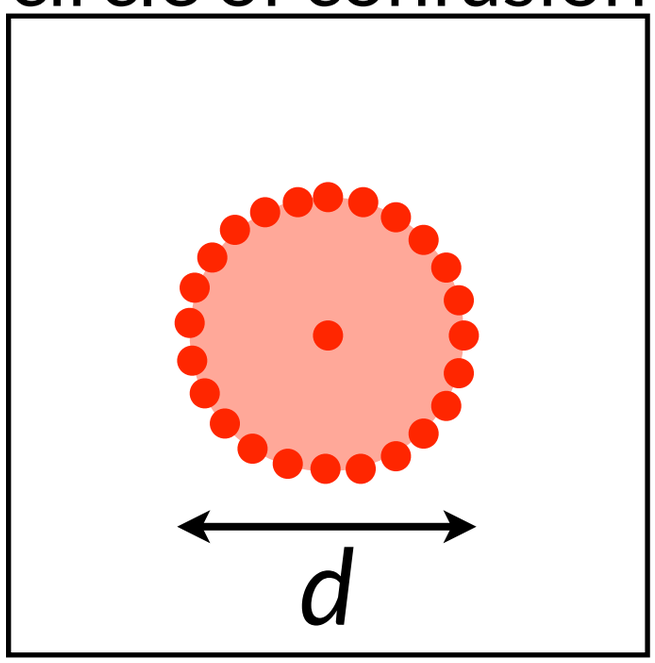

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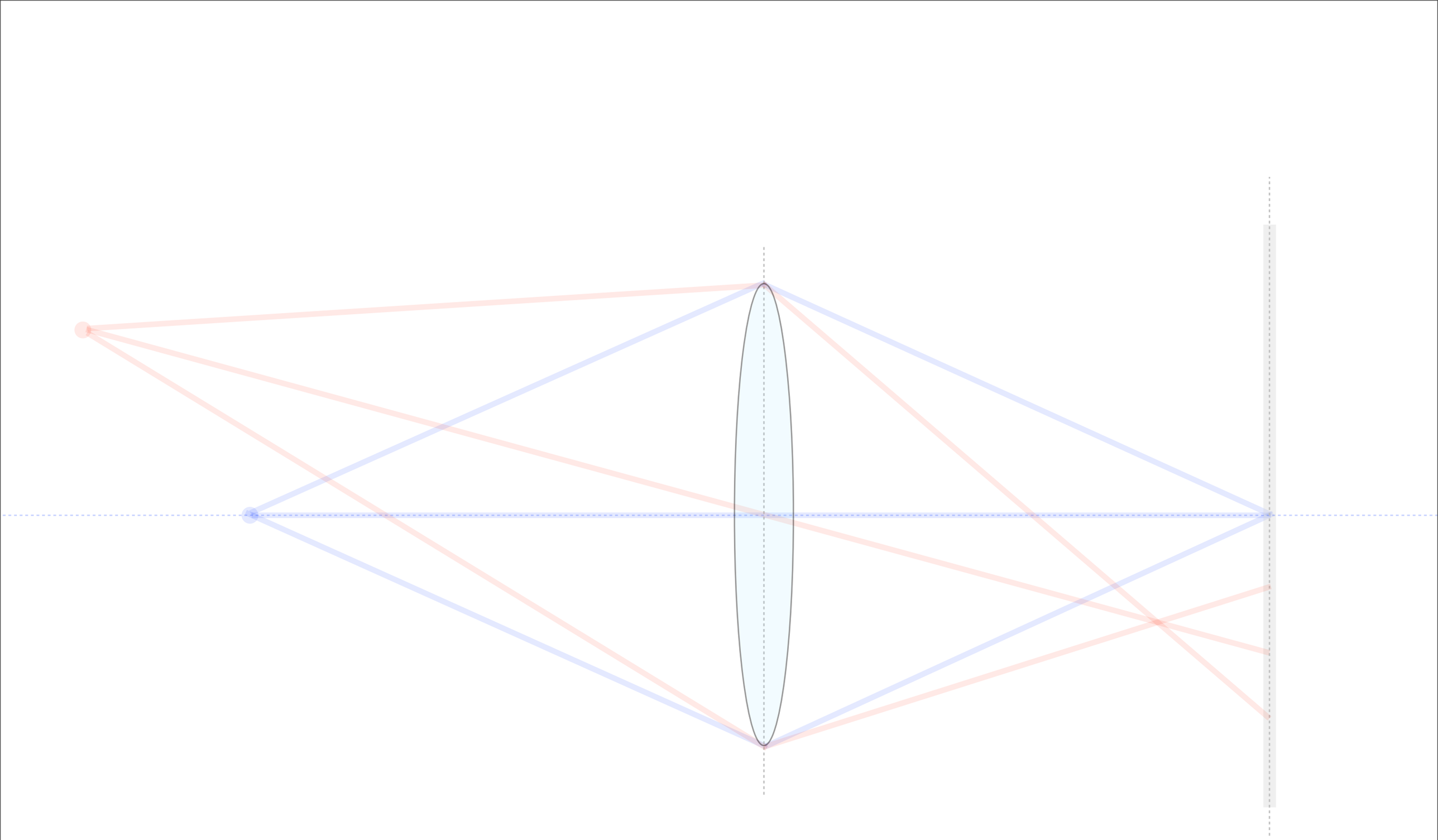

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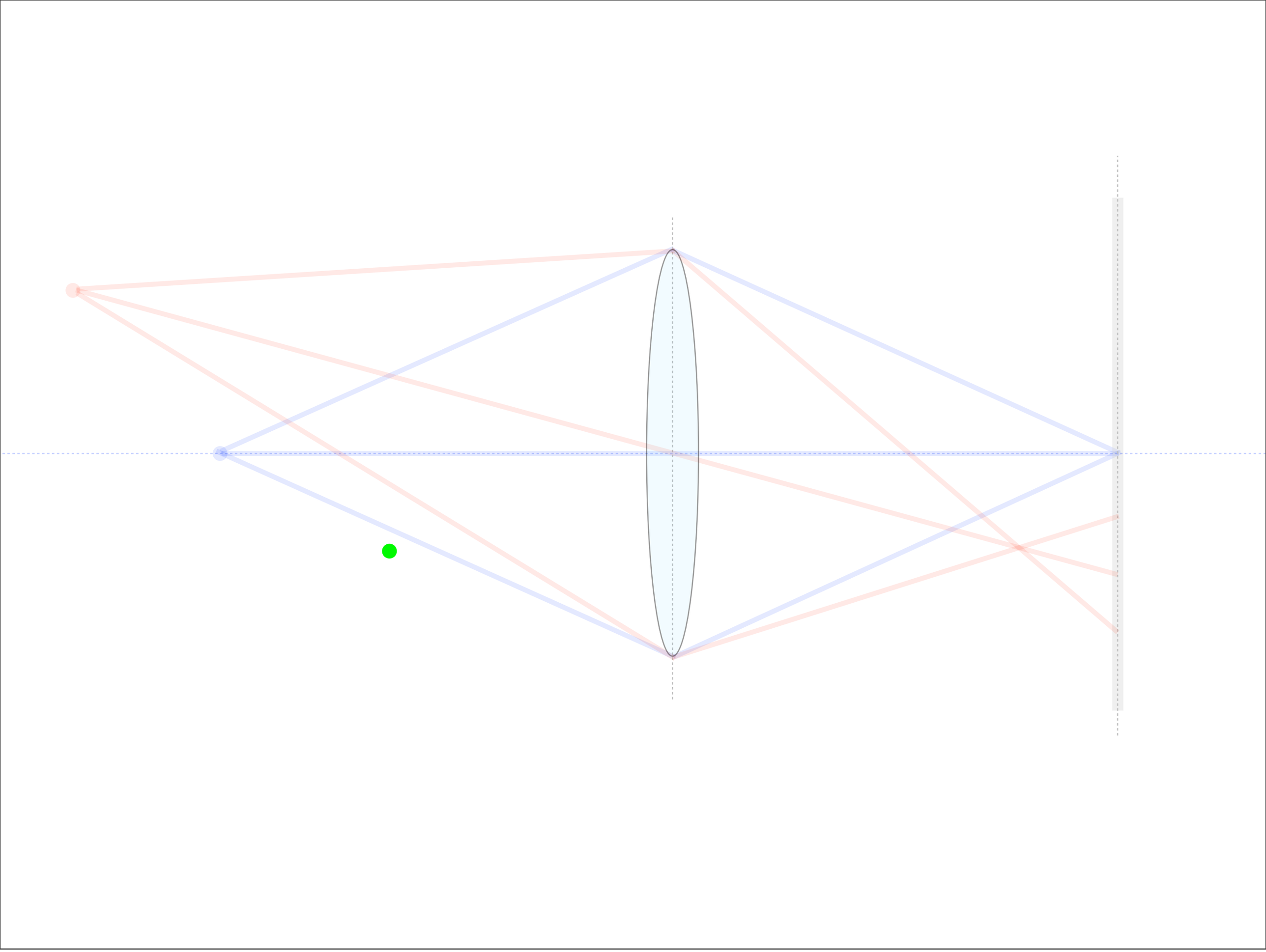

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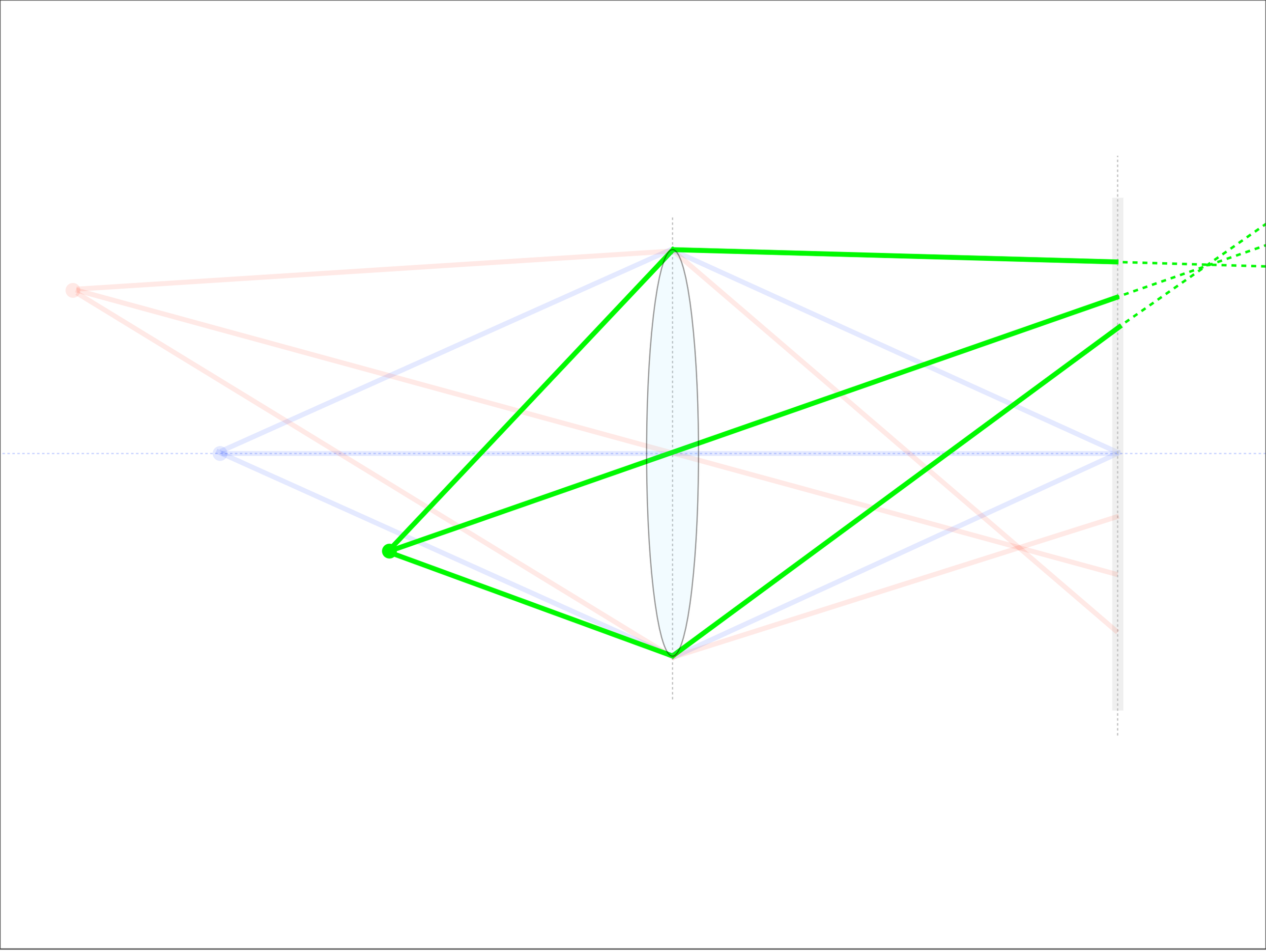

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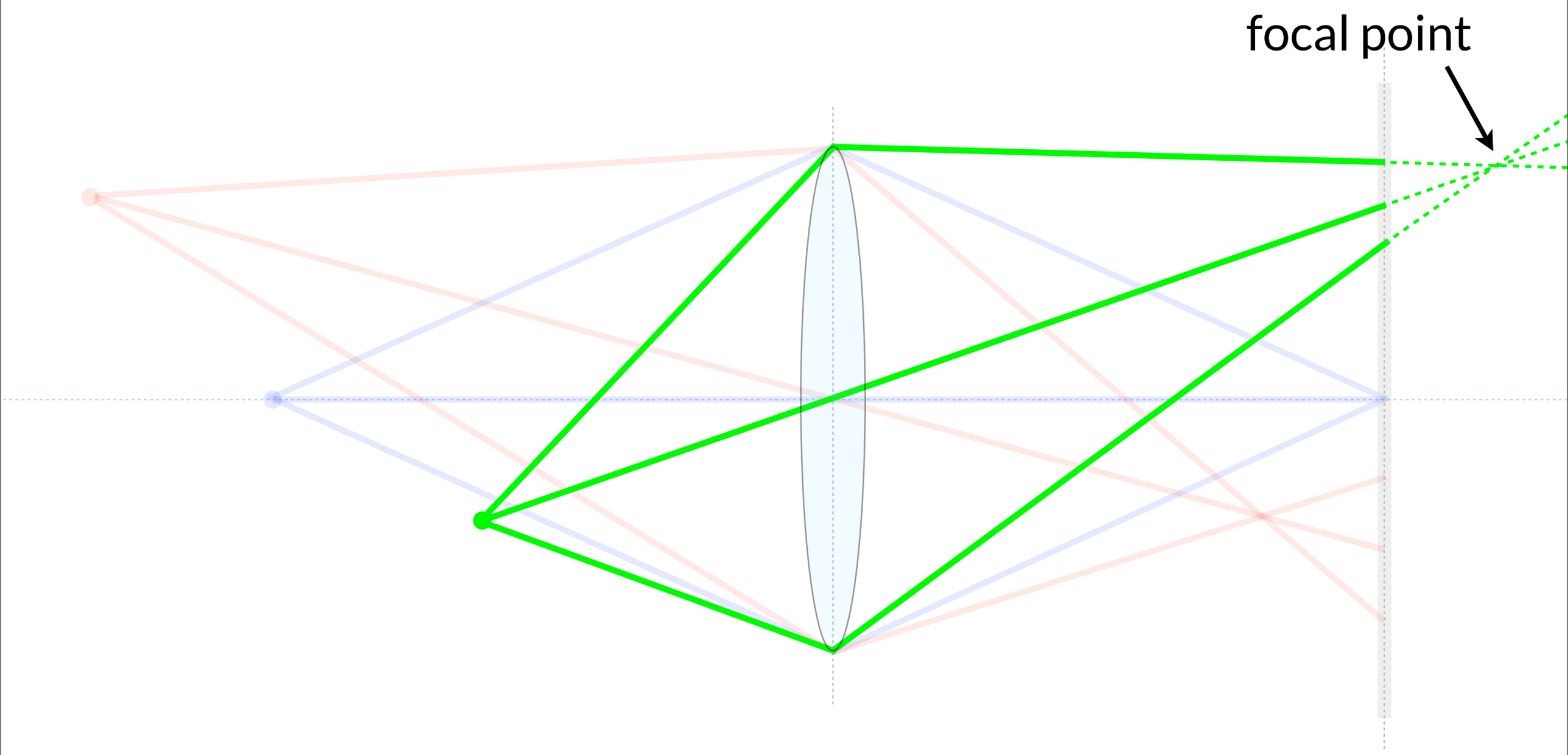

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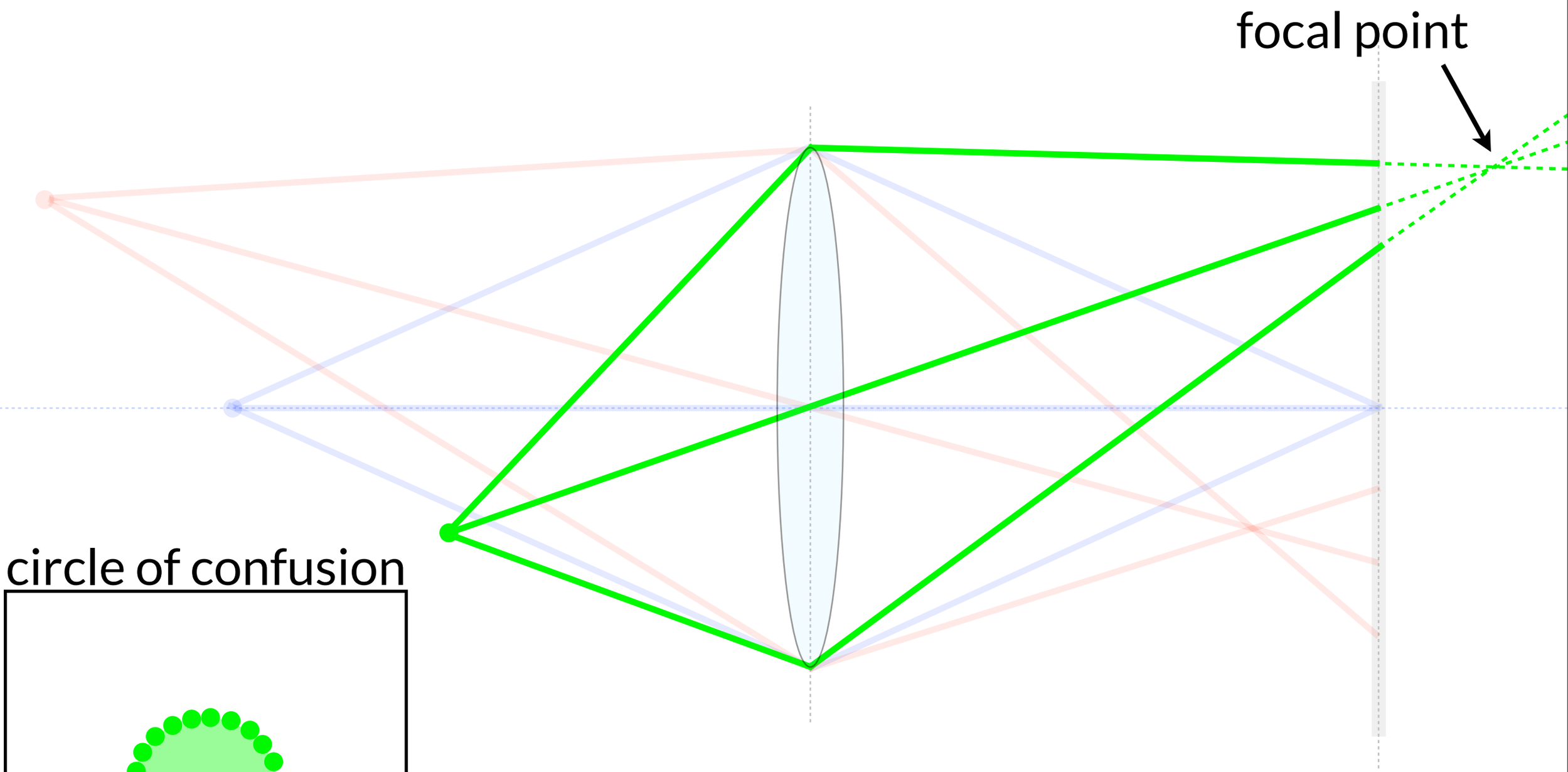

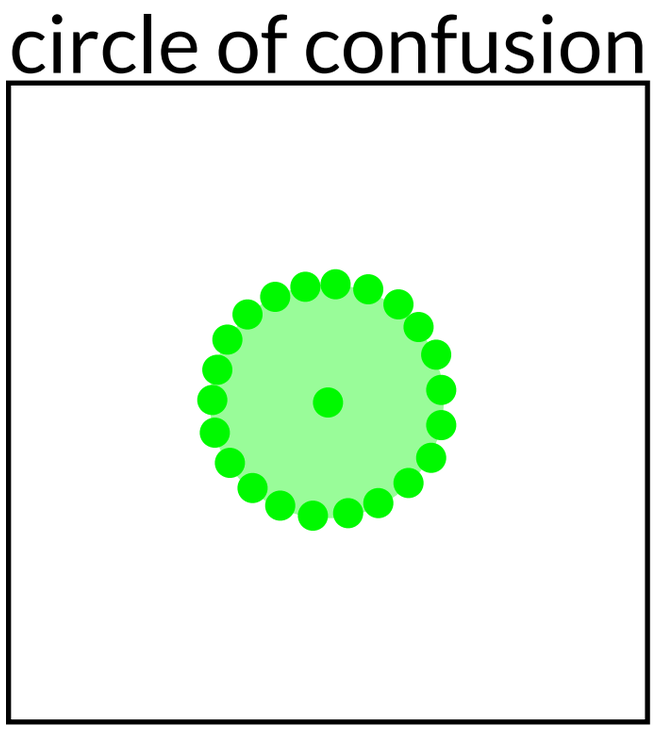

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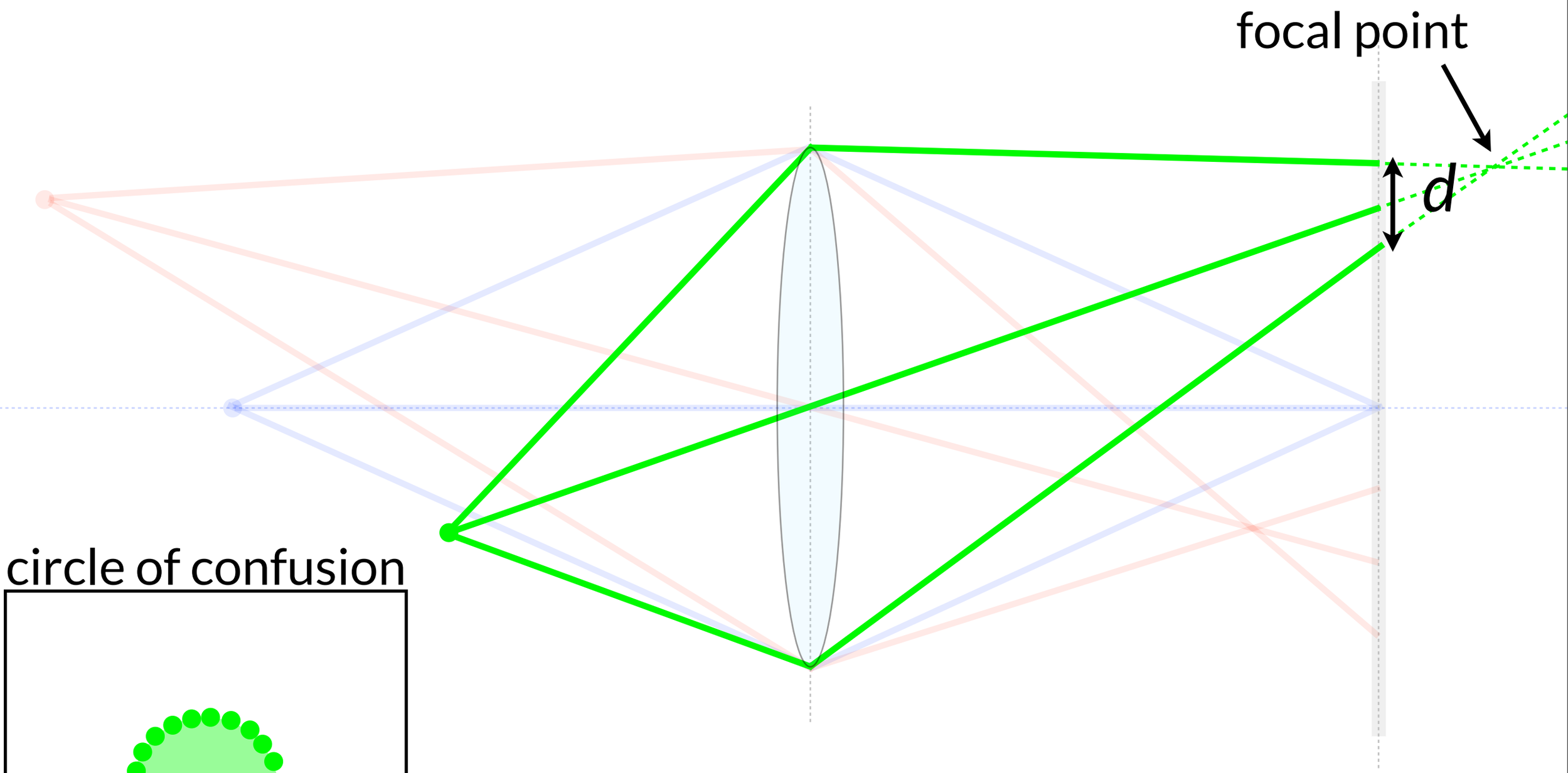

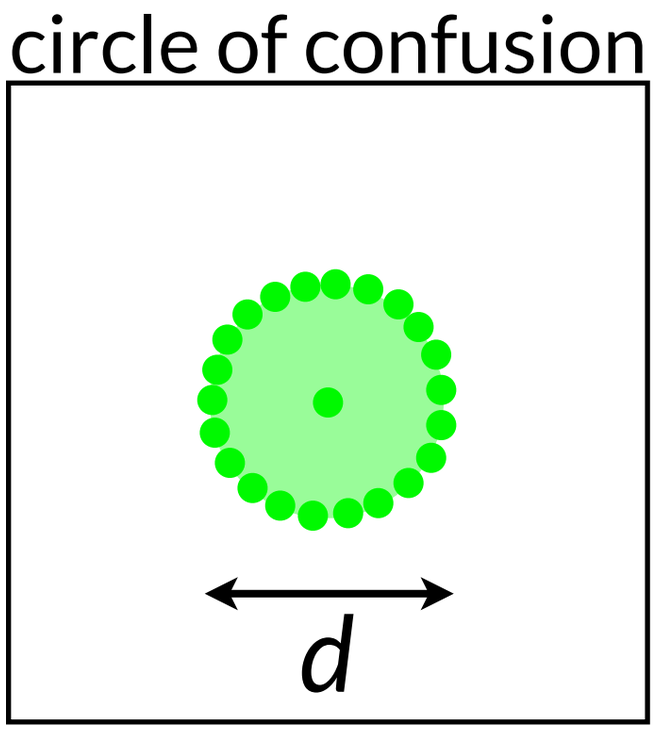

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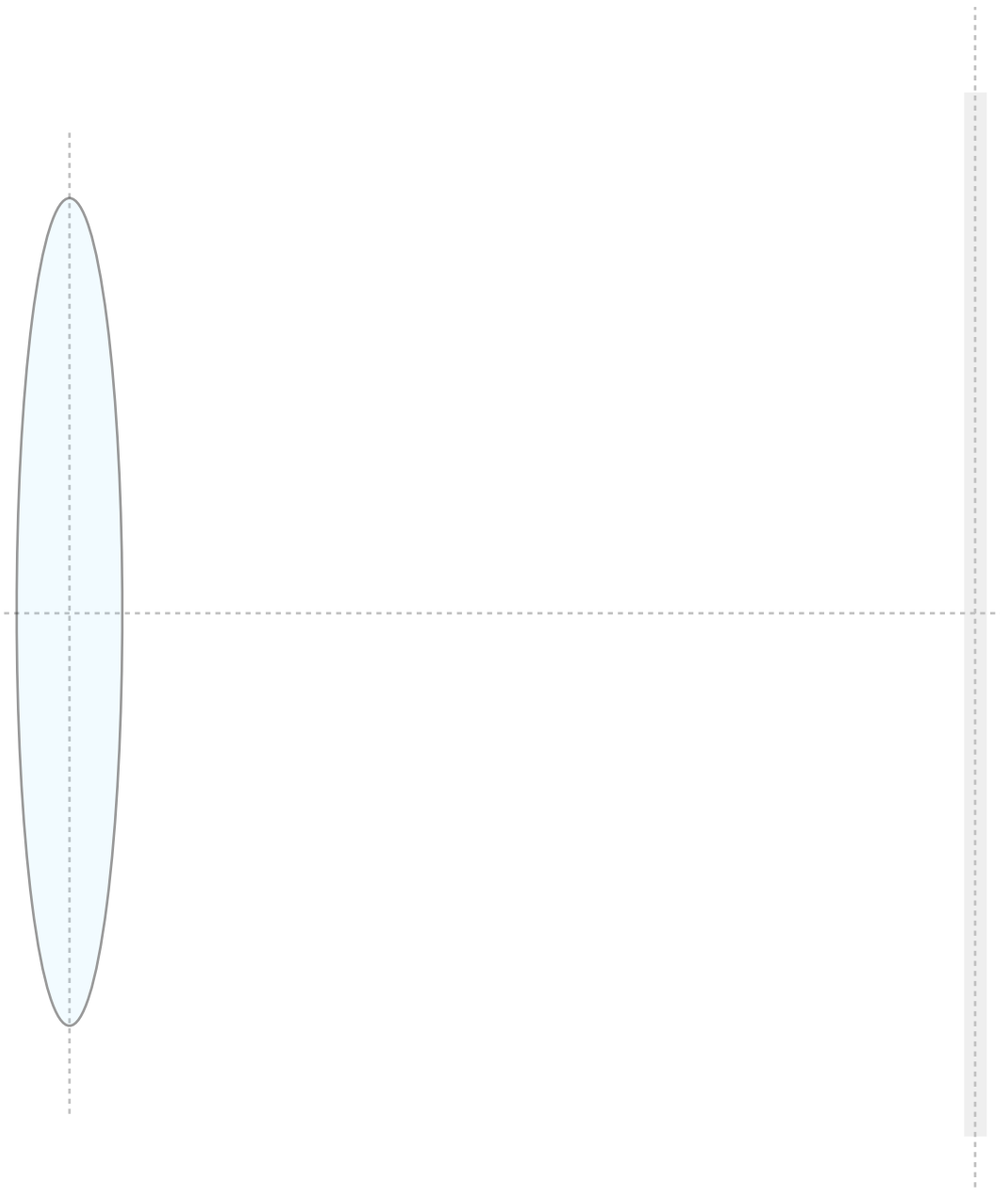

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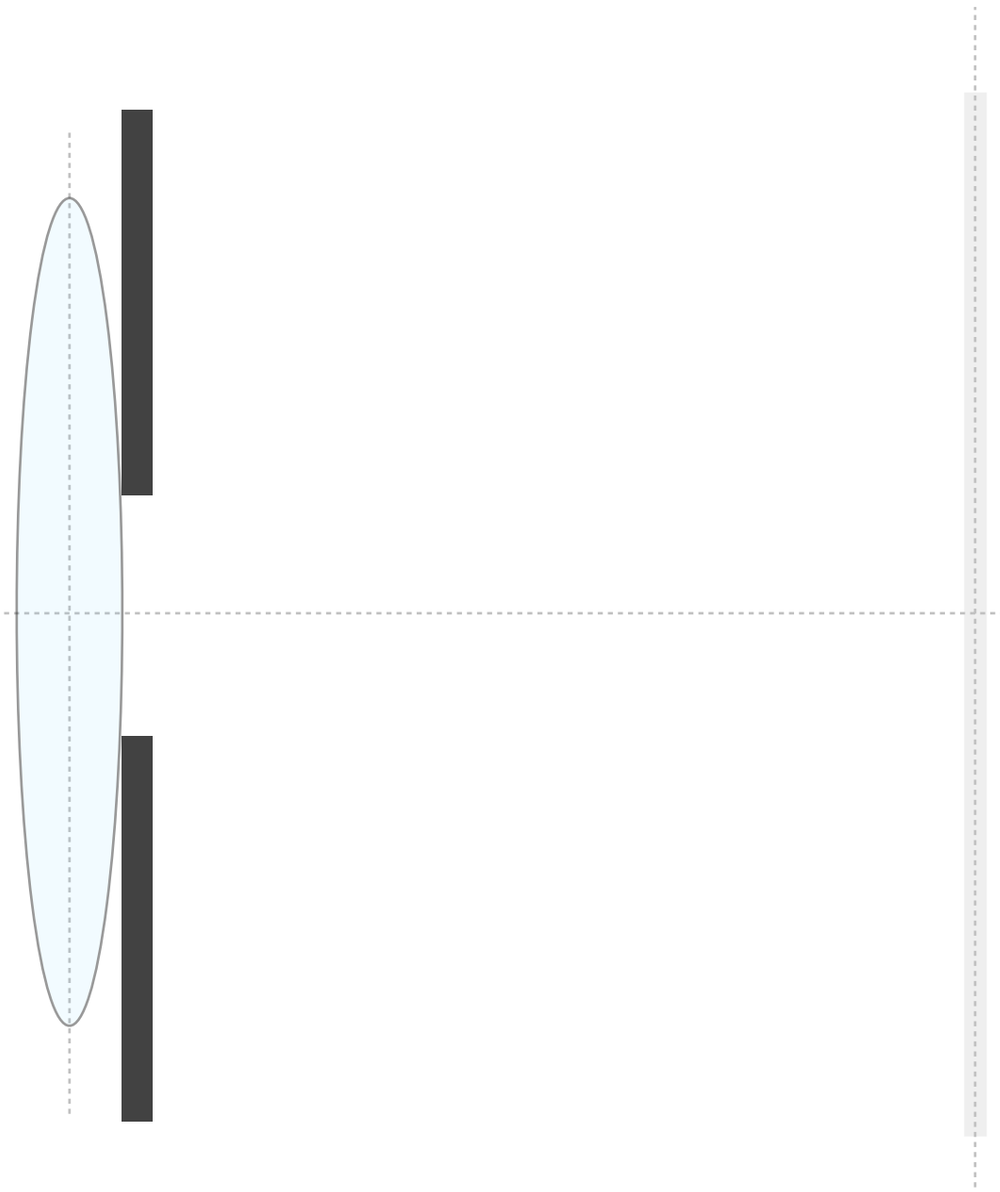

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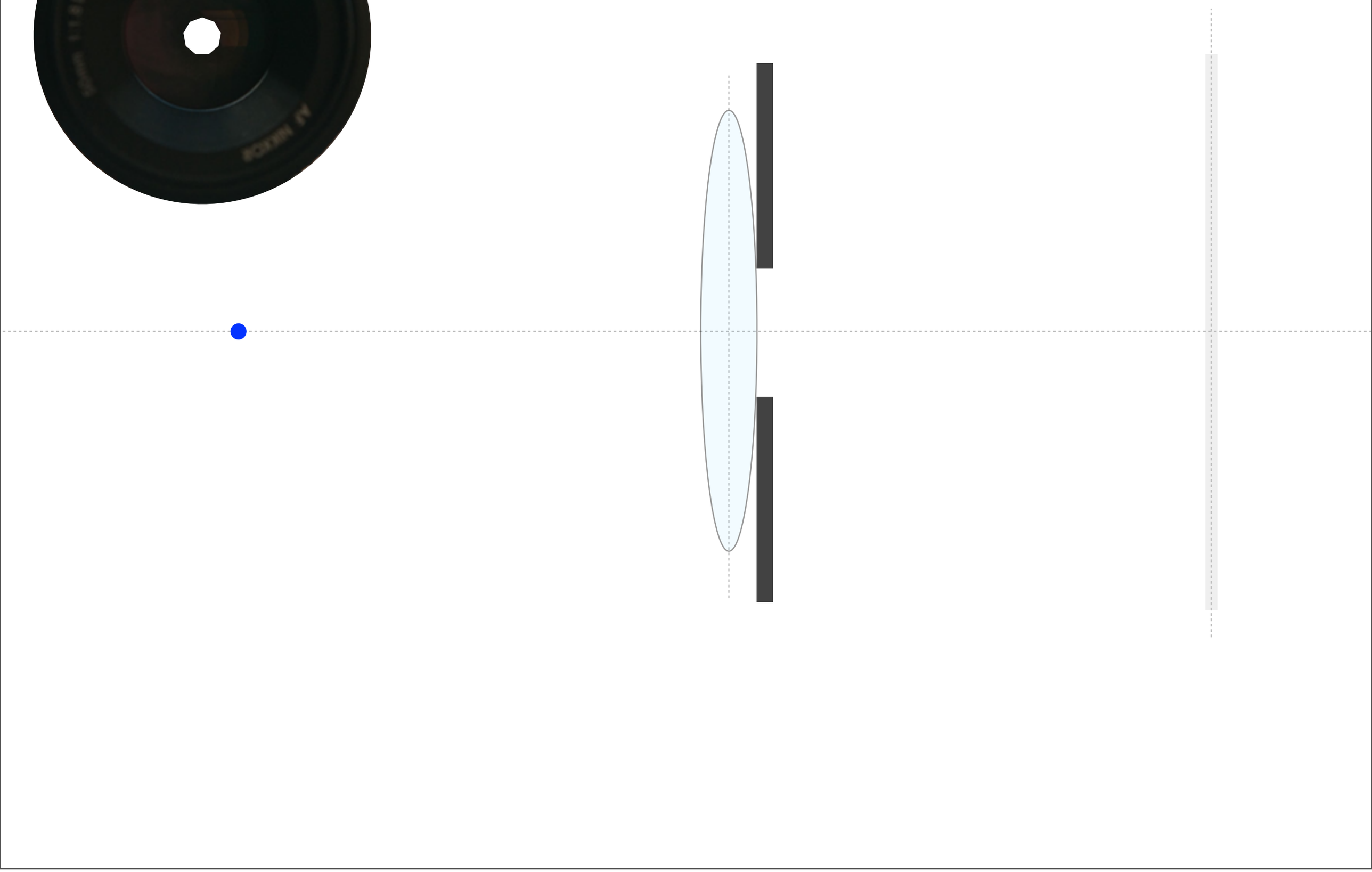

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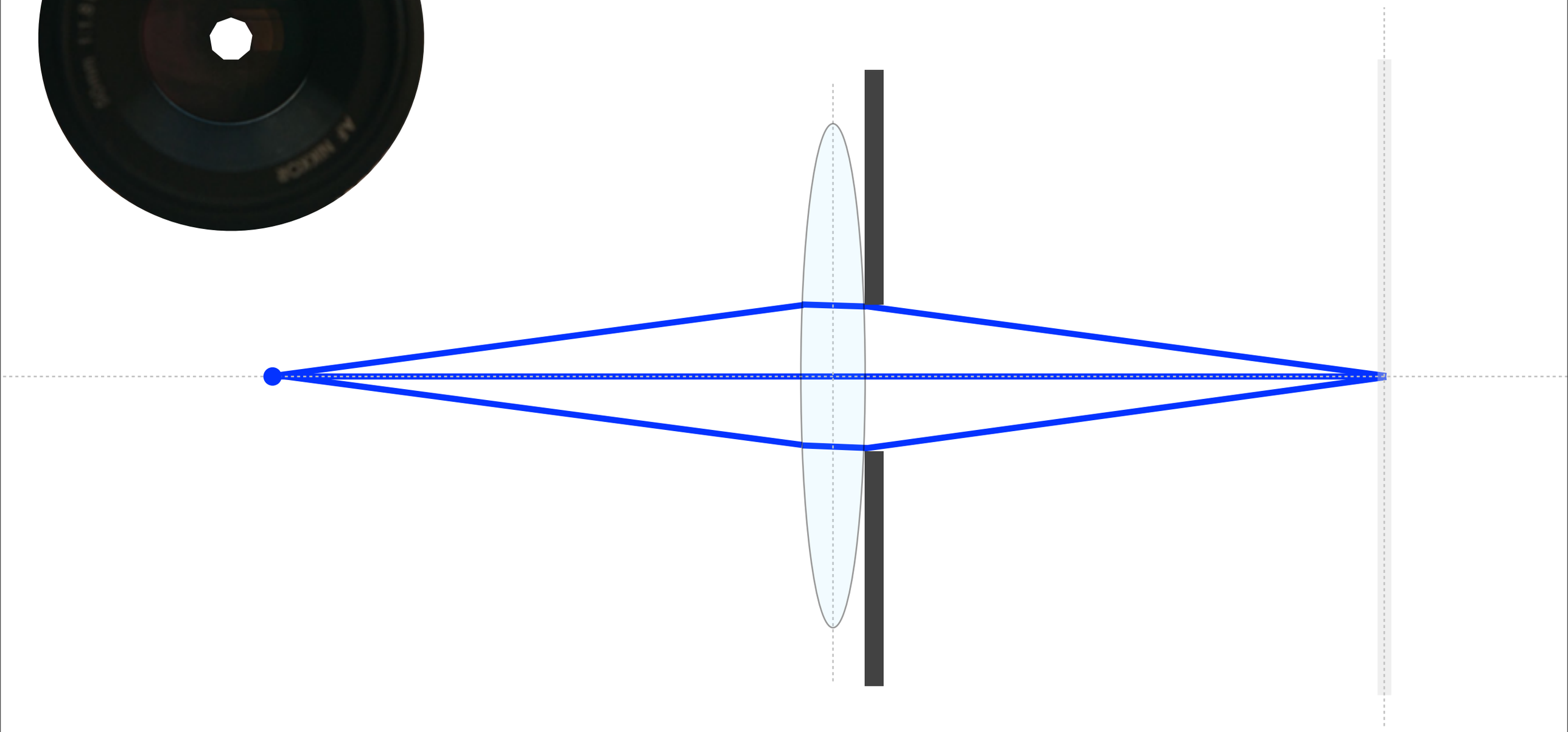

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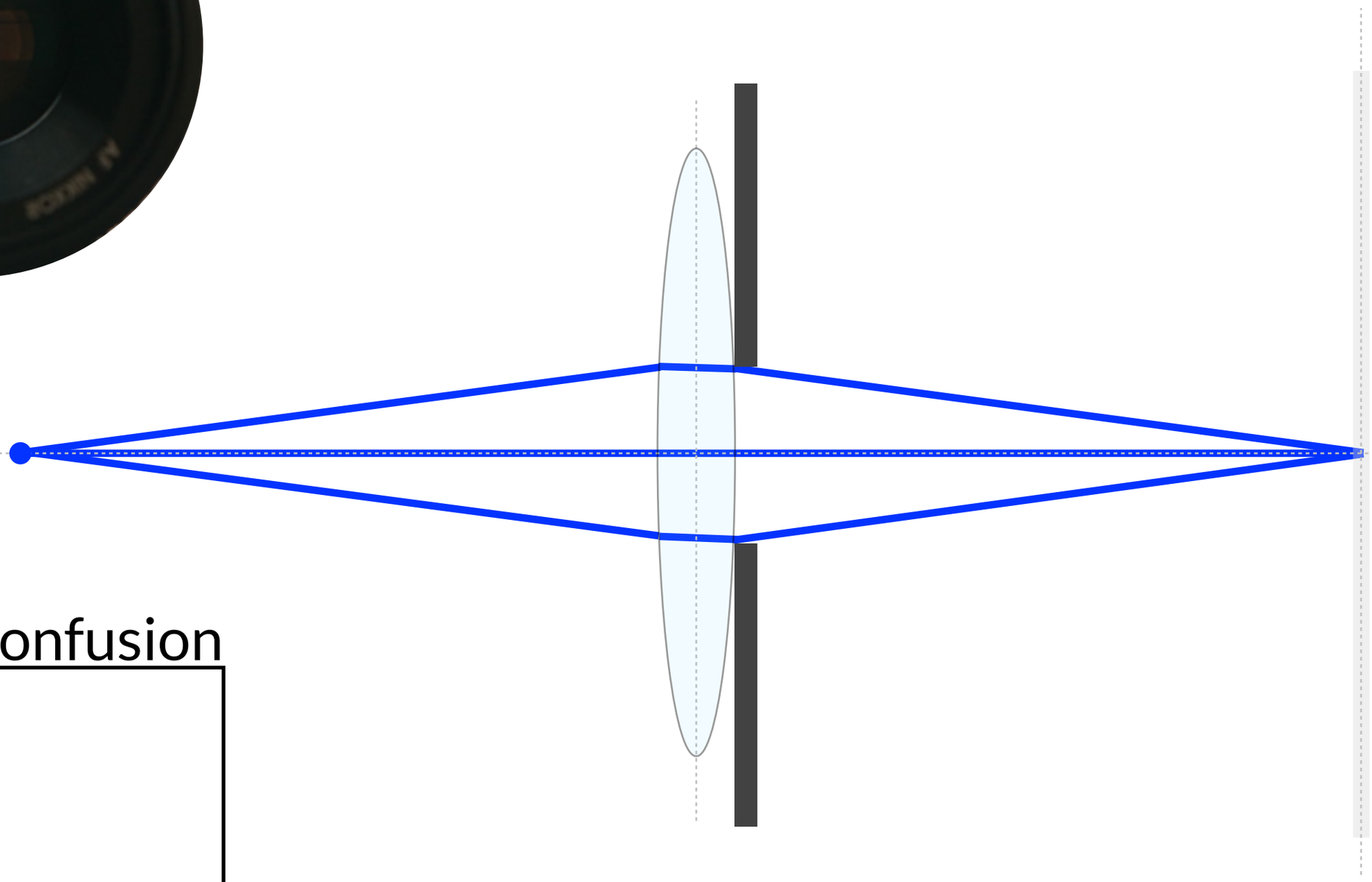

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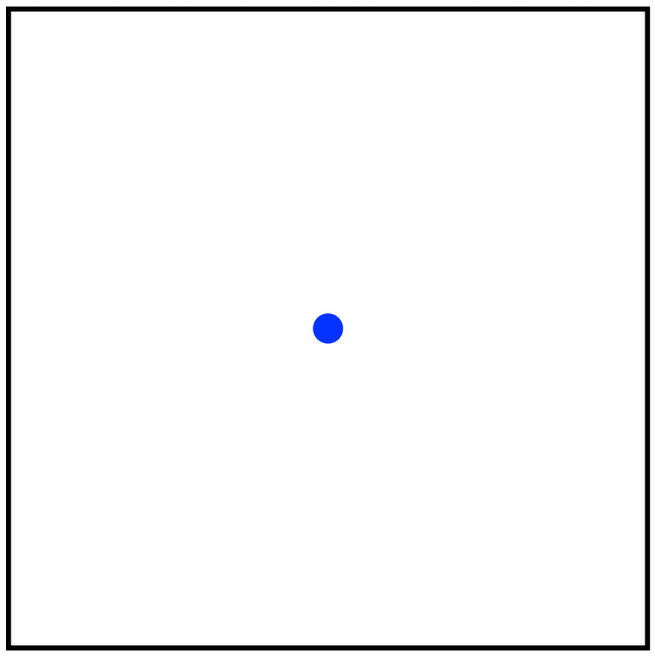

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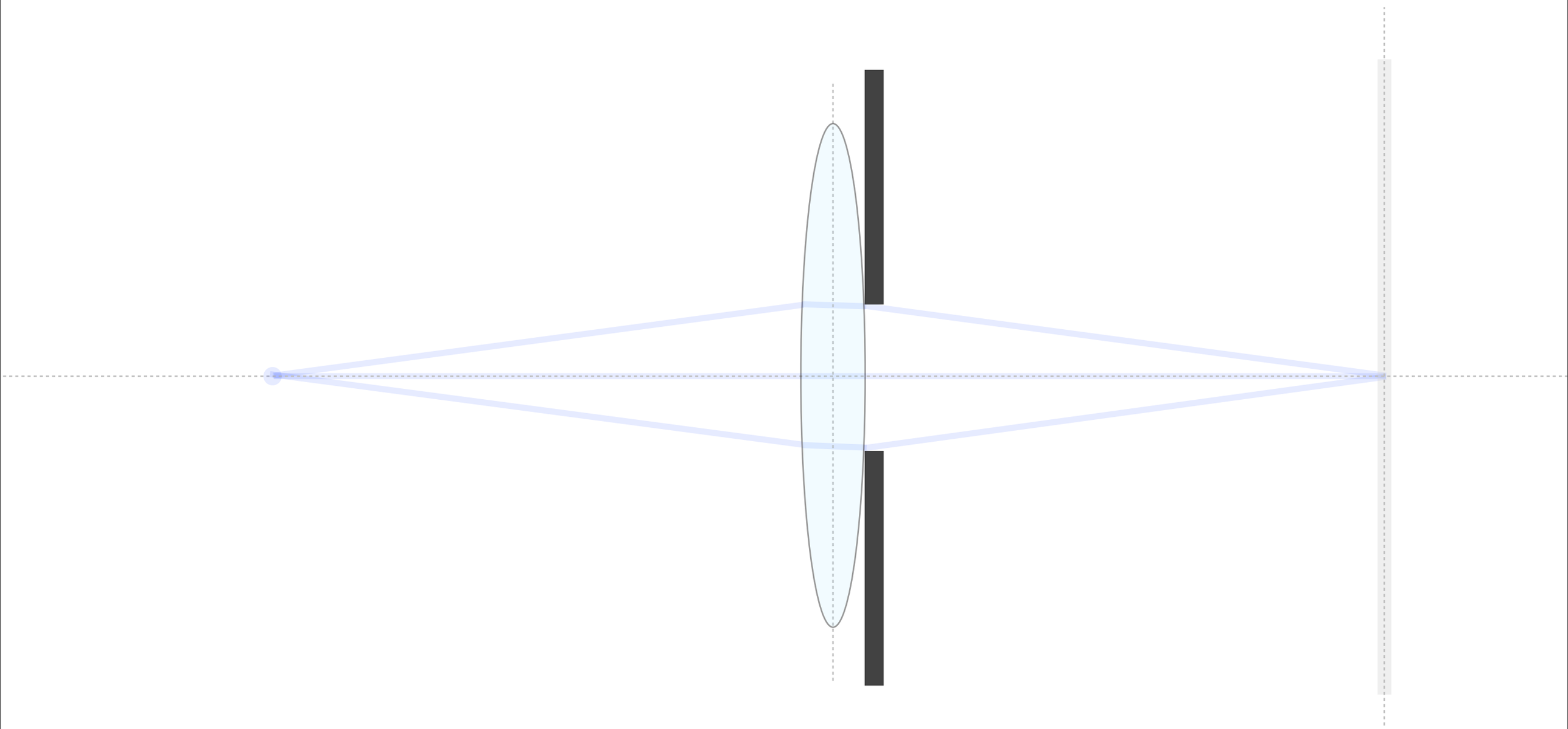

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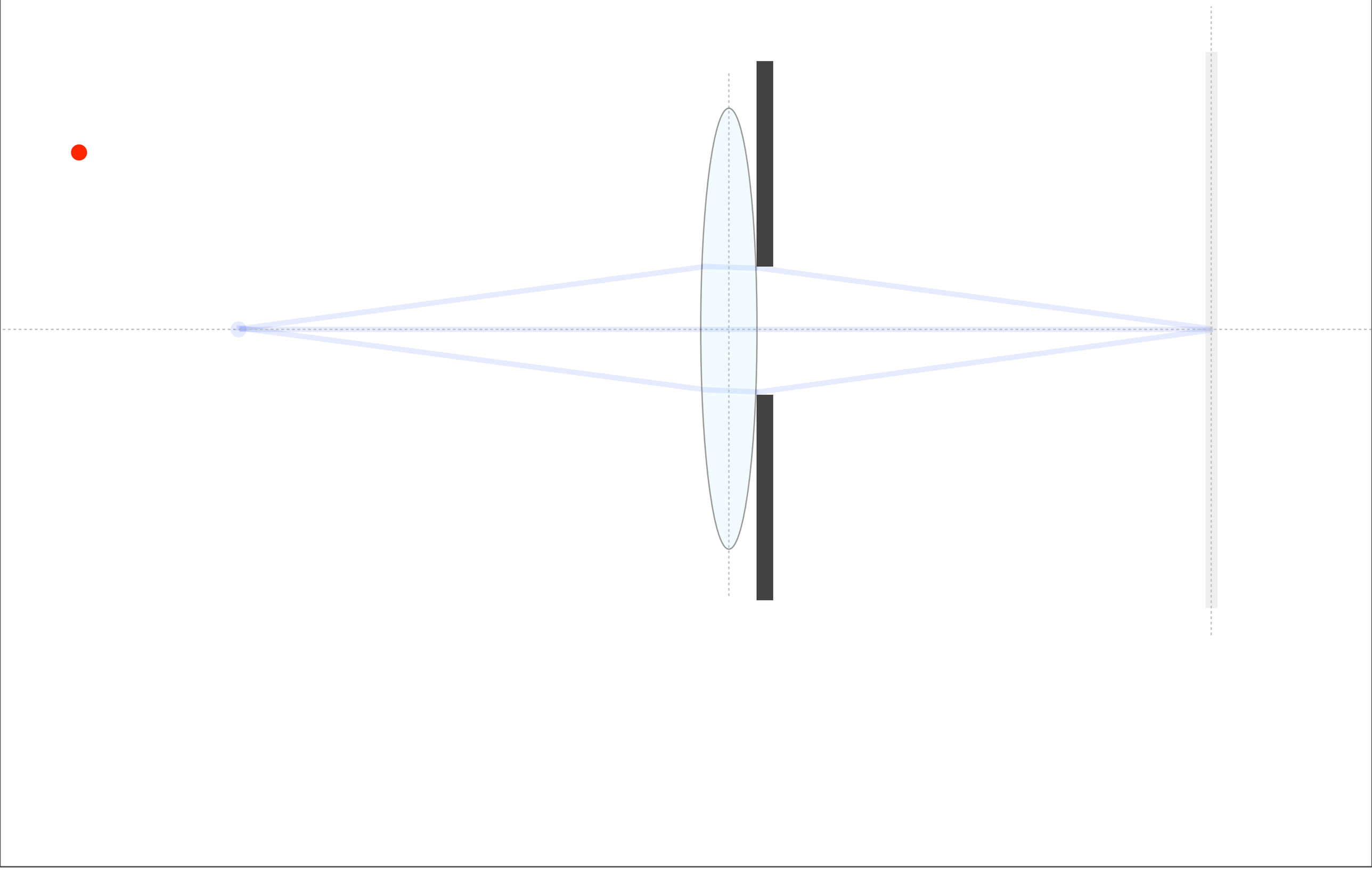

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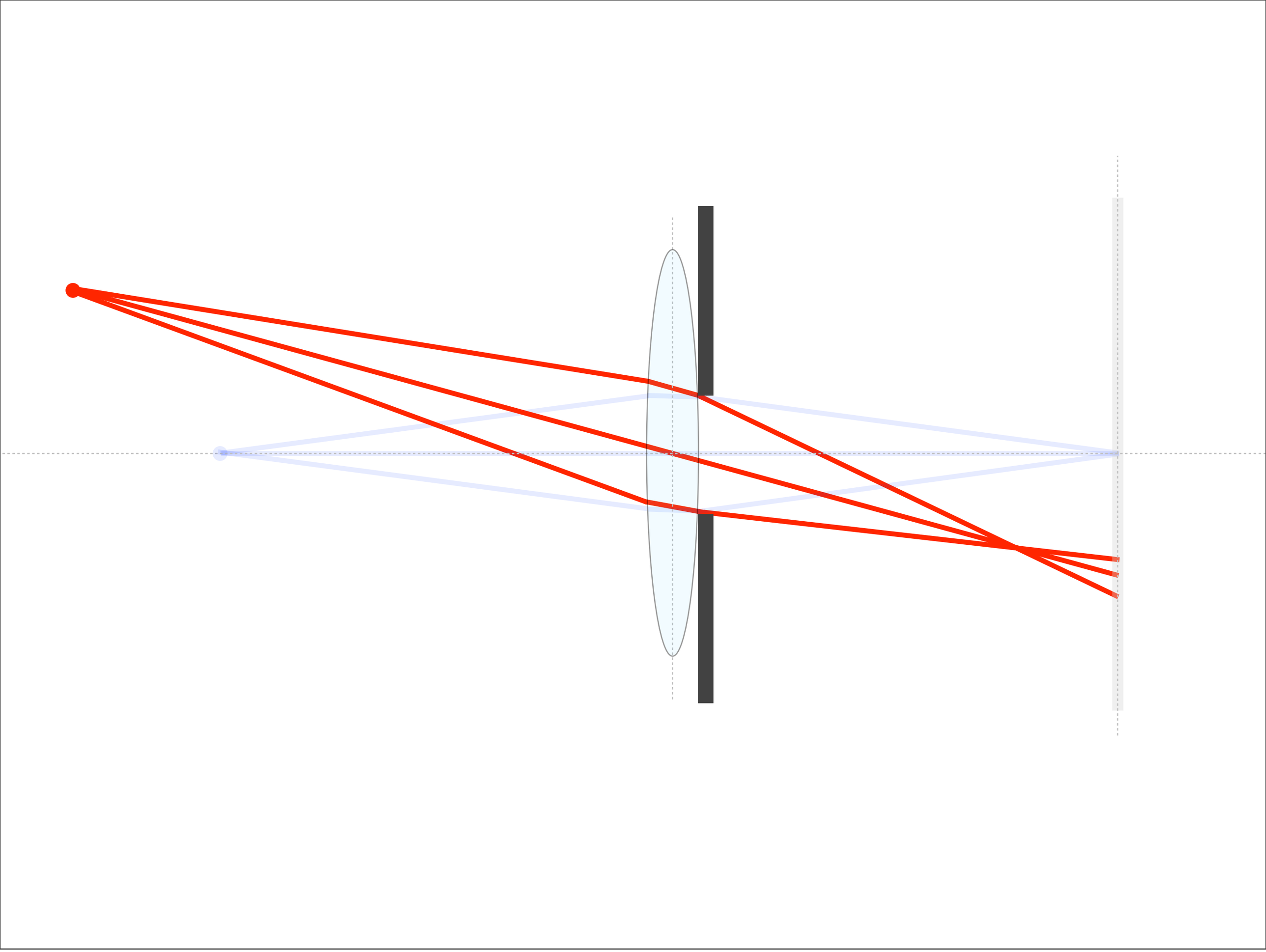

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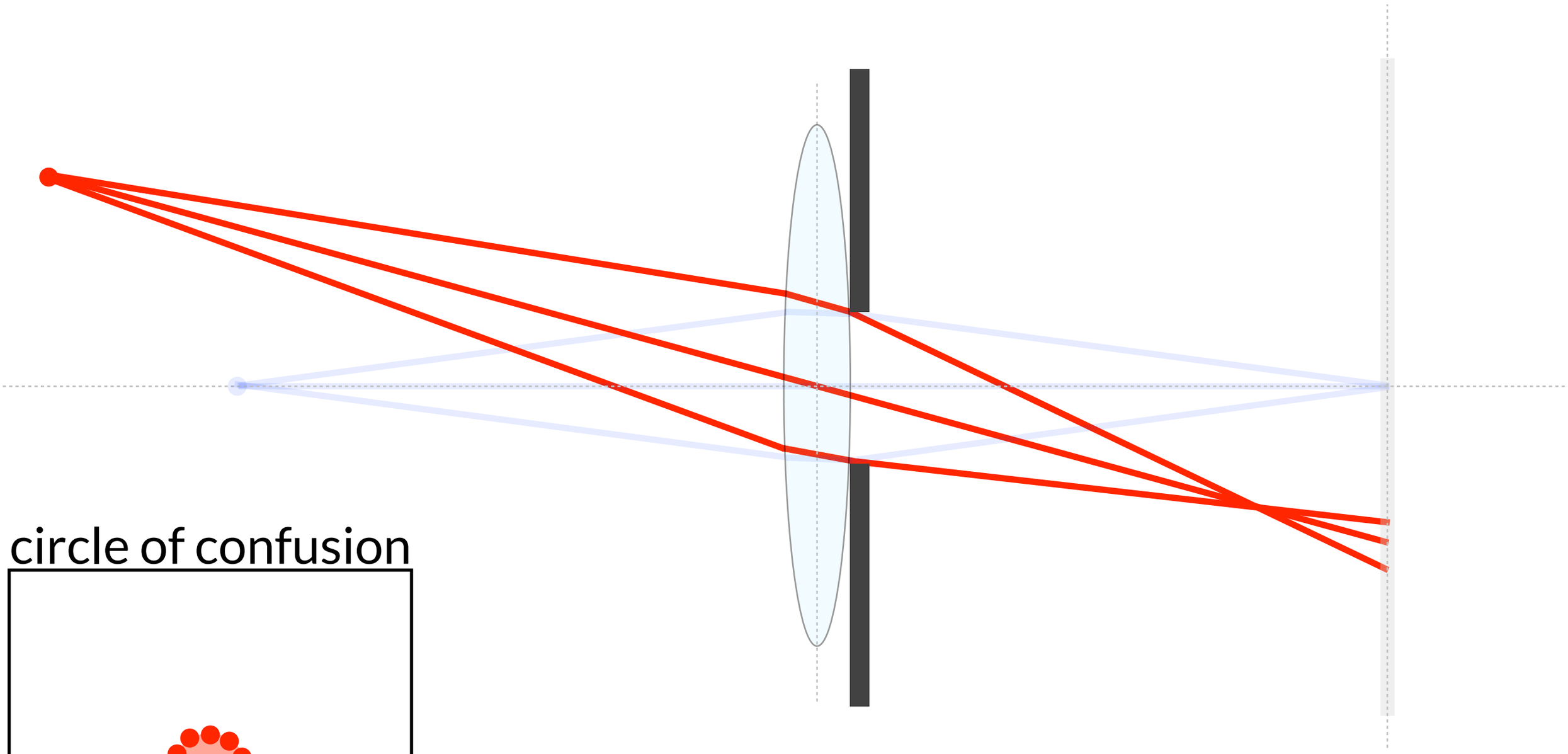

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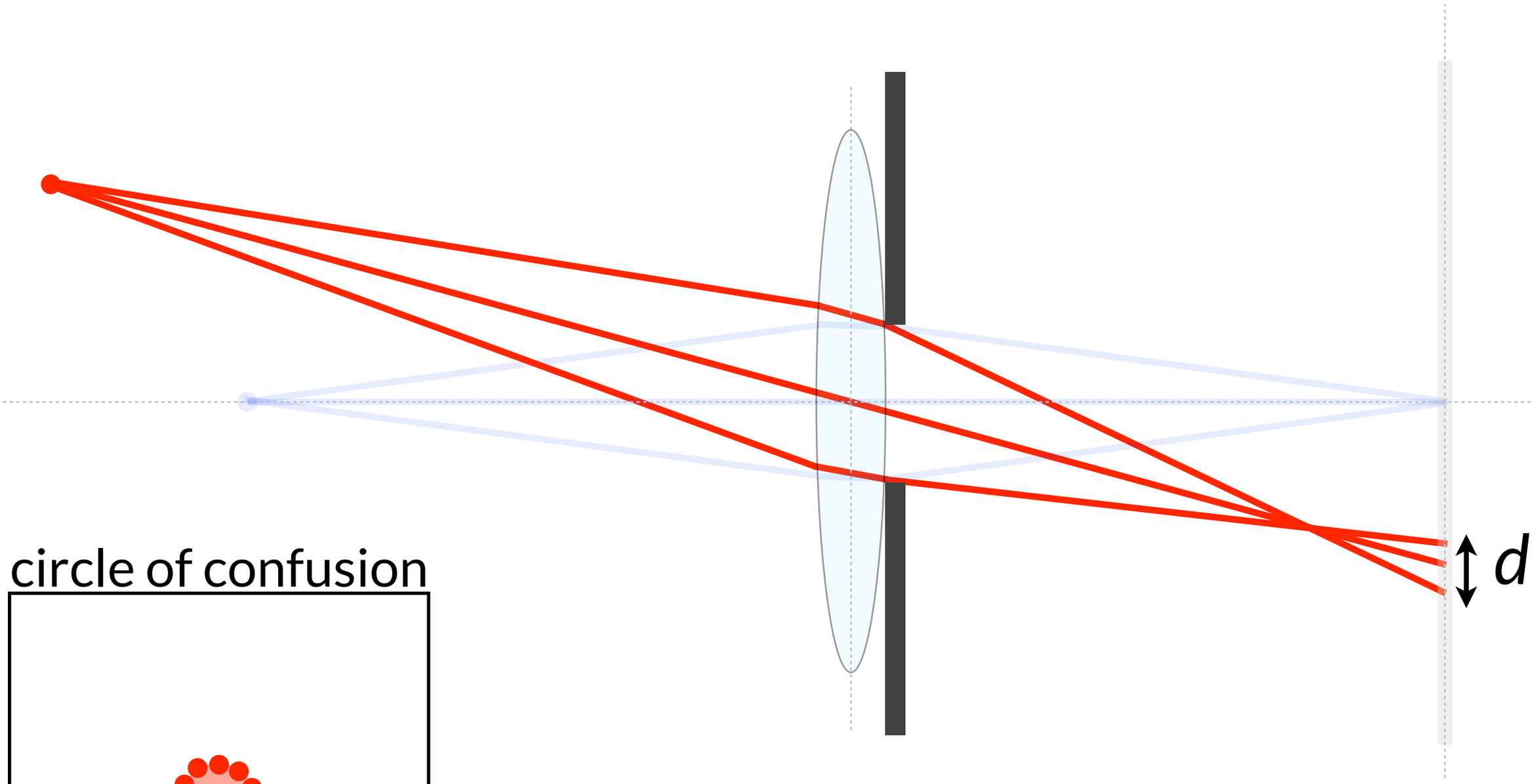

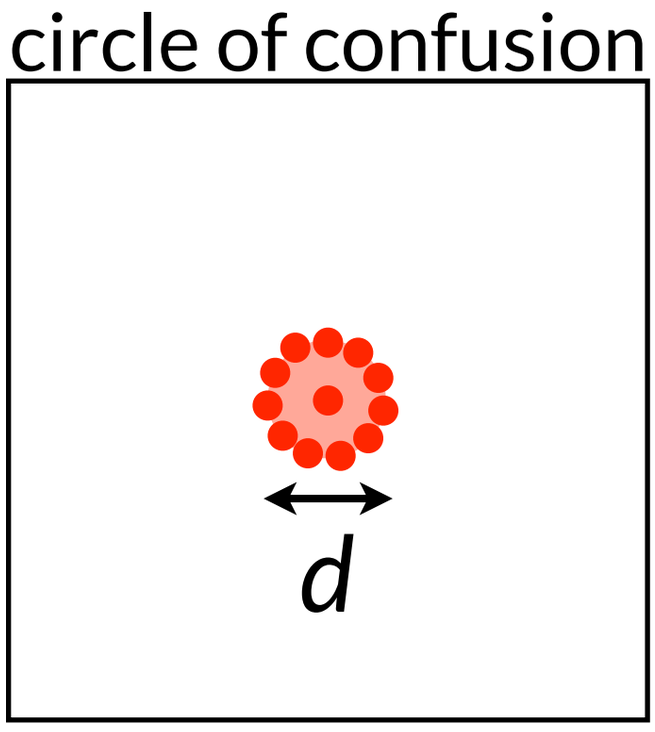

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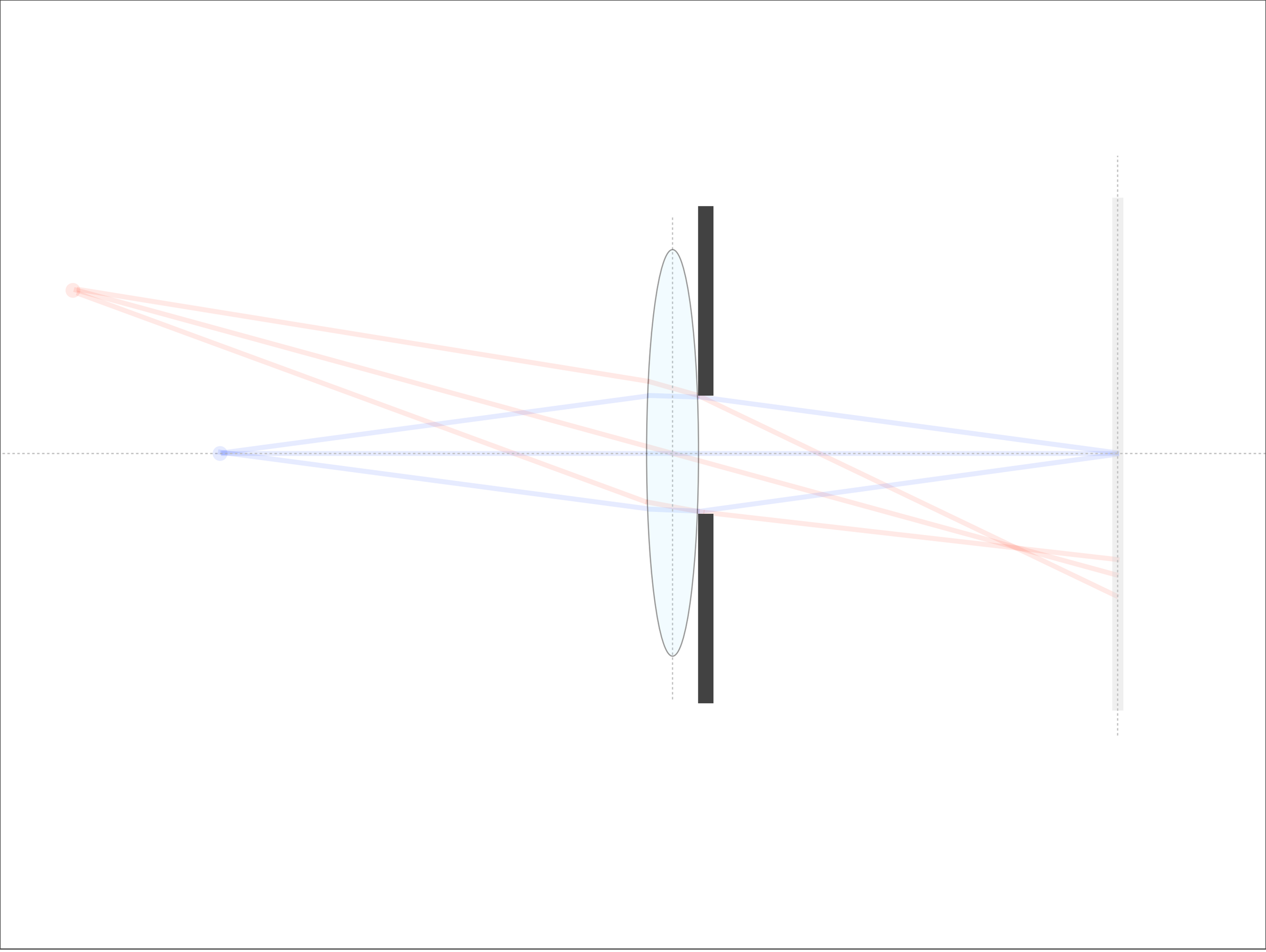

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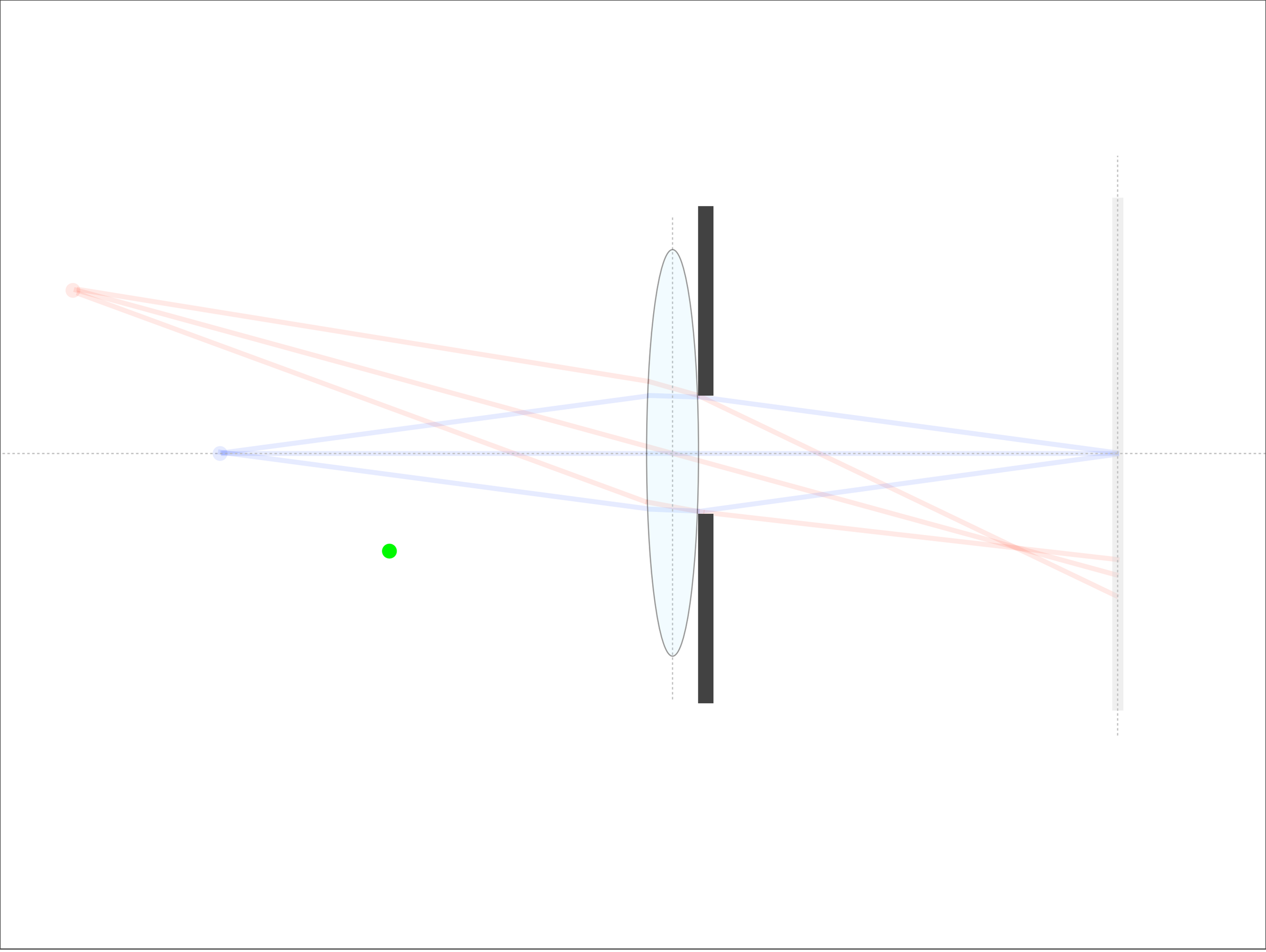

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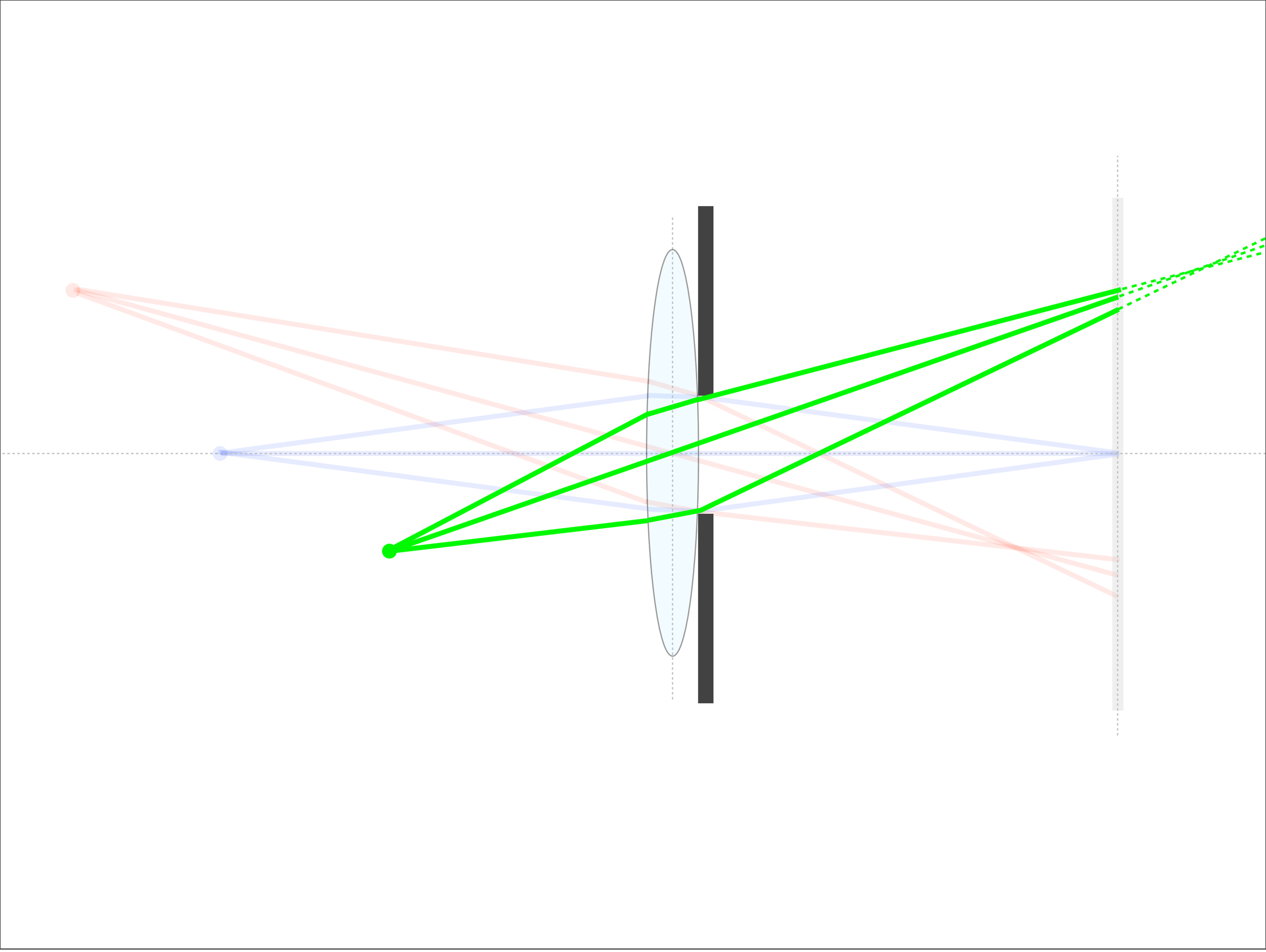

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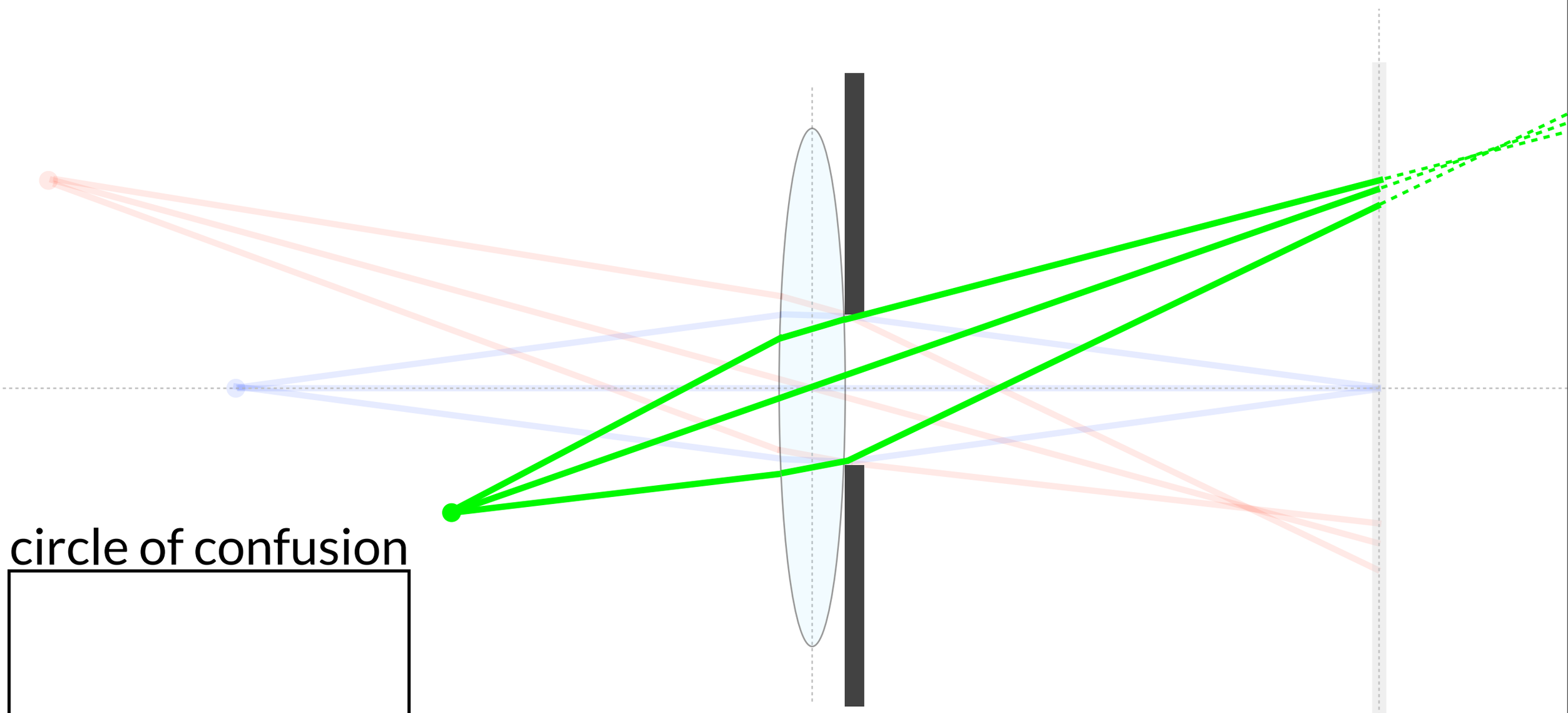

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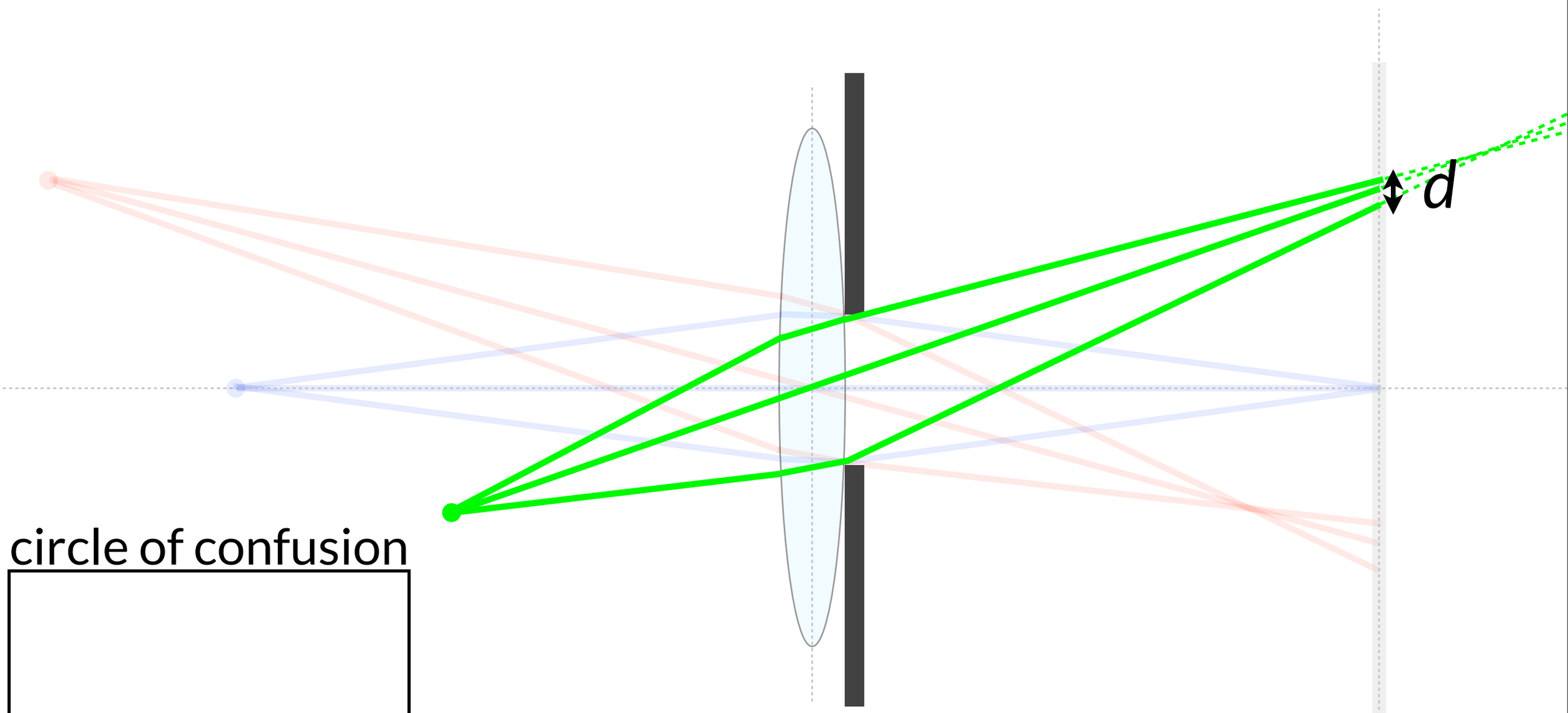

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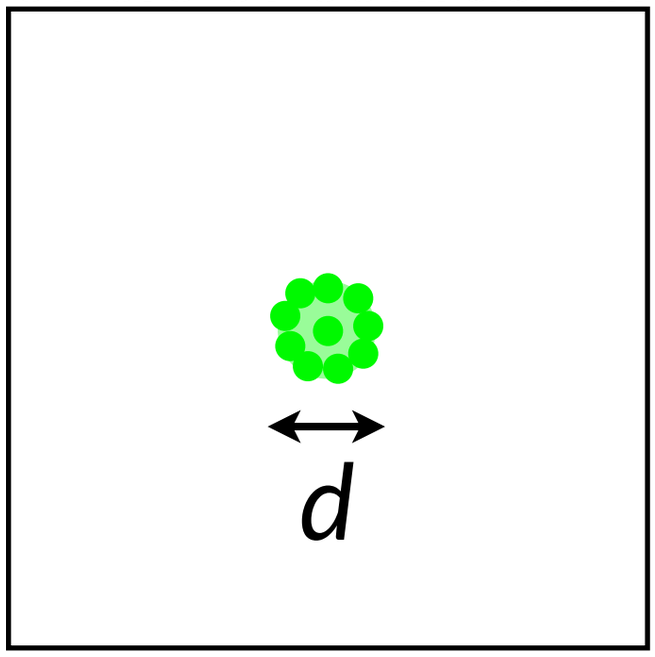

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- camera-to-subject distance

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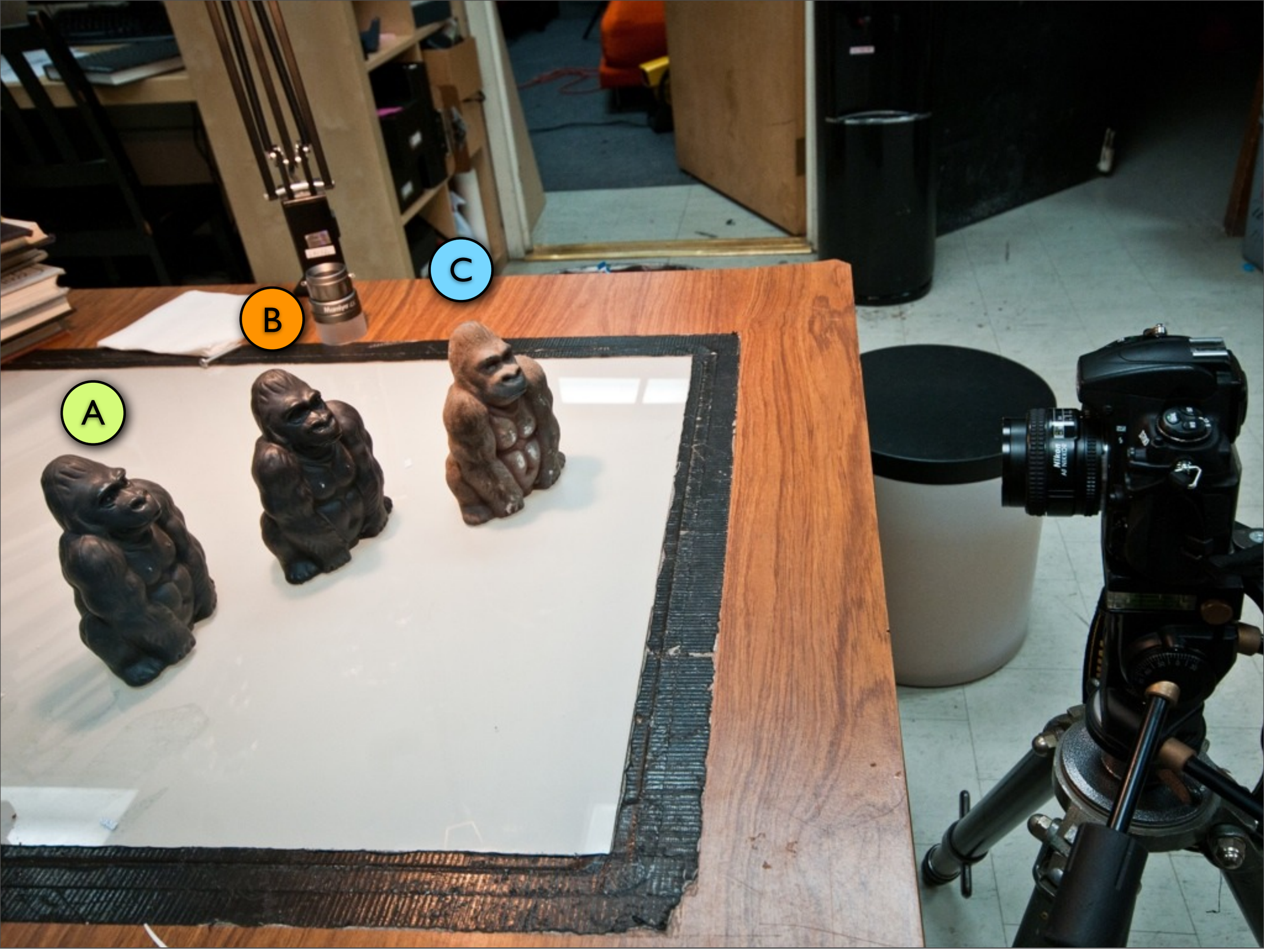

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f/1.4 *1/60 sec*

f/1.4 *1/60 sec*

f/1.4

1/60 sec

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f/1.4 *1/80 sec*

f/1.4 *1/80 sec*

f/1.4

1/80 sec

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f/1.4 *1/80 sec*

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f/1.4

1/80 sec

When to use **narrow** DoF?

When to use **wide** DoF?