

# The Art and Physics of Focus

Mastering Optical Convergence and Visual Storytelling

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# The Geometry of Sharpness

## // REFRACTION:

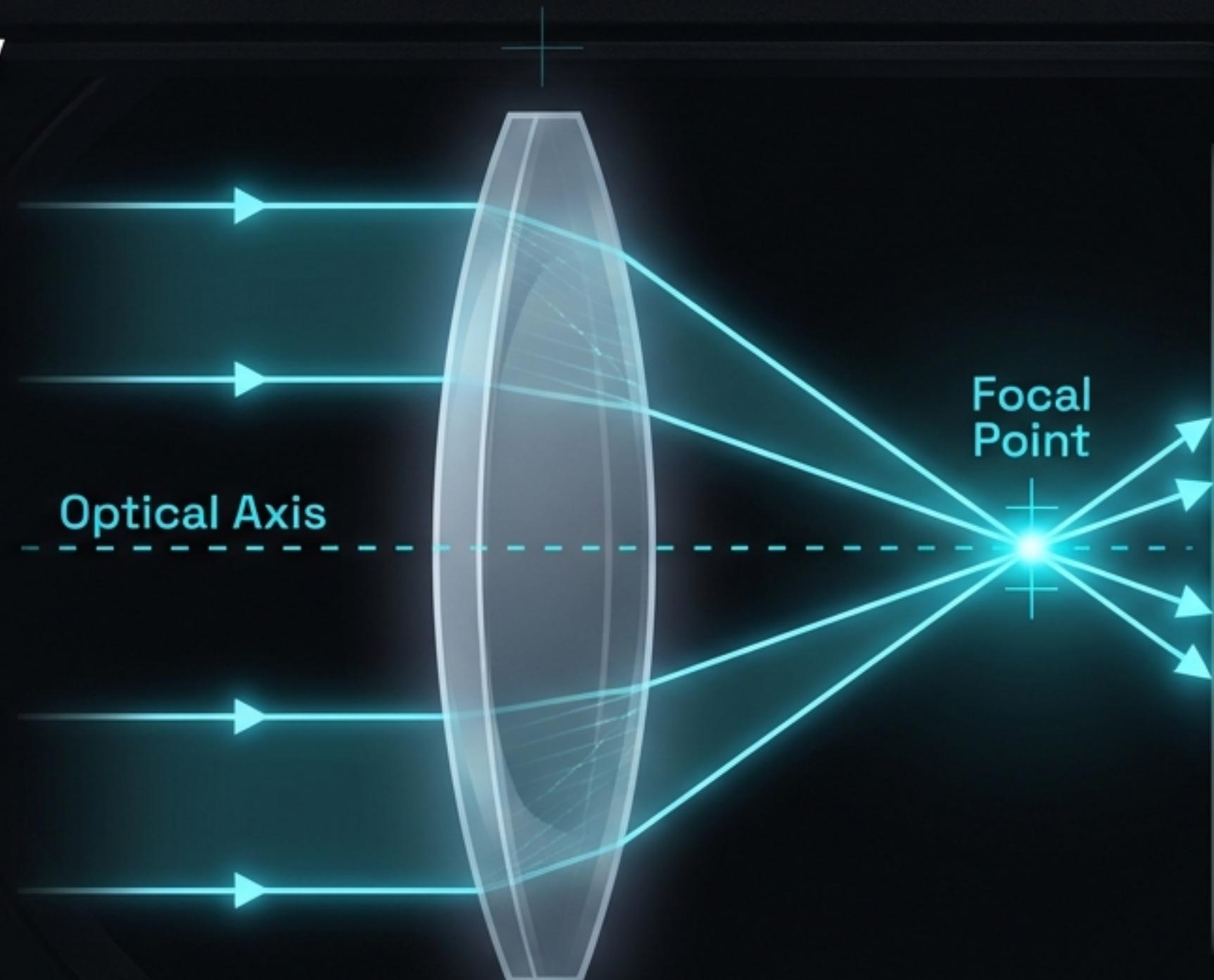
Light bent by glass elements.

## // FOCAL POINT:

Rays meeting at a single point.

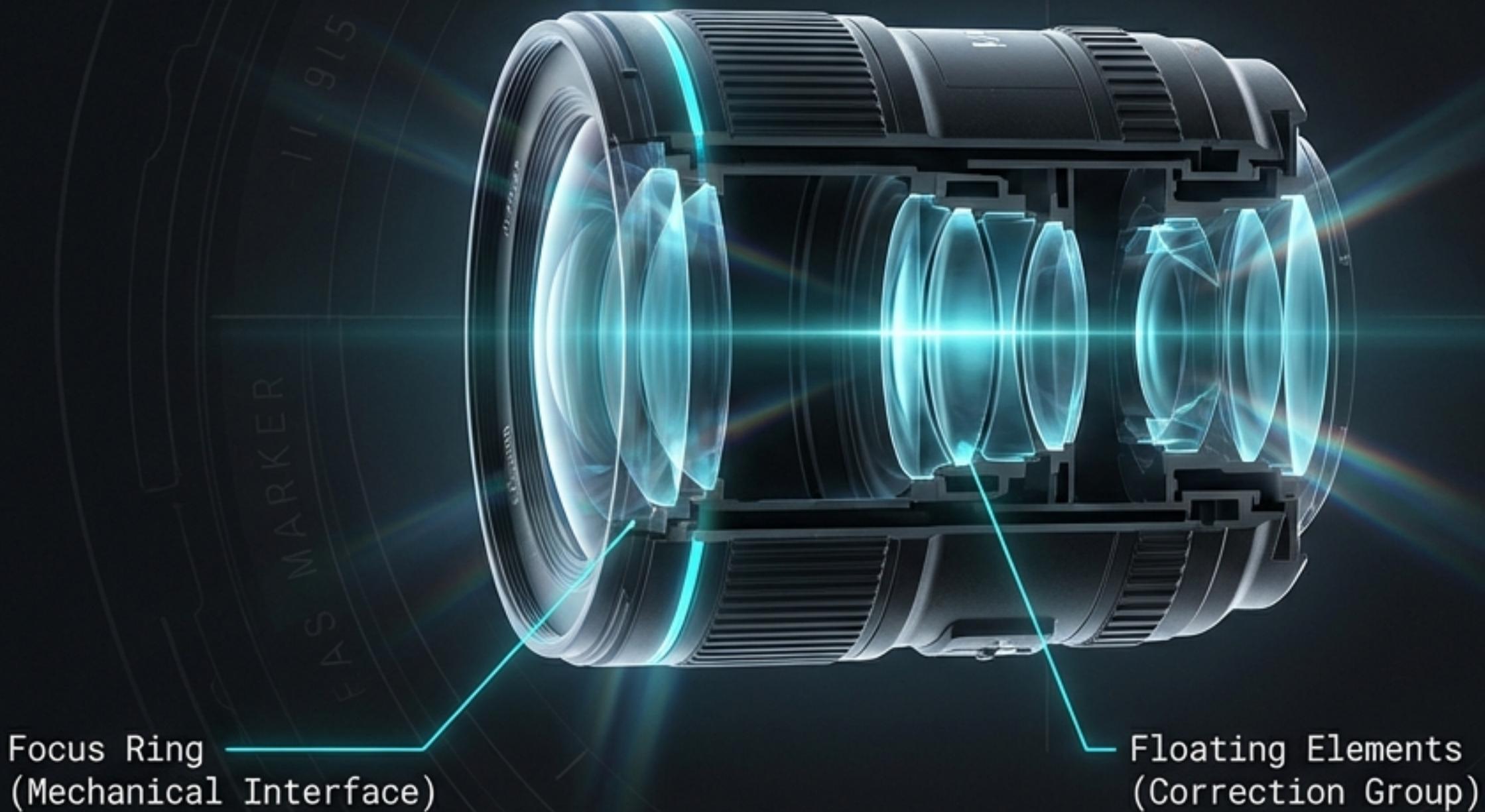
## // CRITICAL ALIGNMENT:

Focal point = Sensor Plane.



Correct Convergence = Sharp Image

# Inside the Barrel



## Focusing Systems

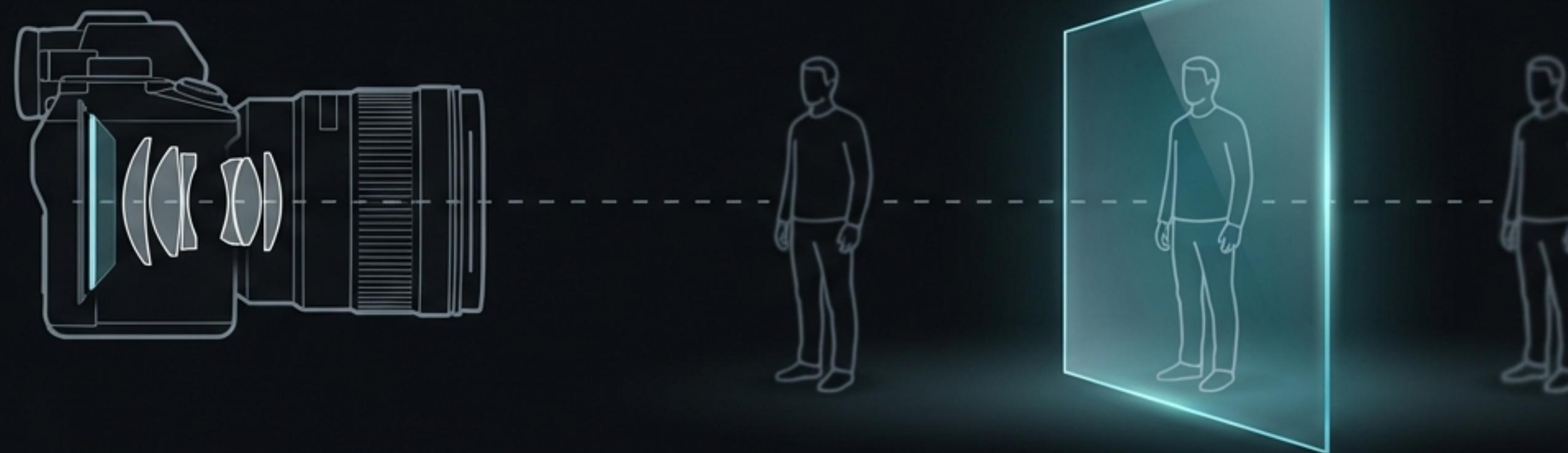
### INTERNAL FOCUSING (IF):

- + Static length
- + Weather sealed
- + Fast operation

### EXTERNAL FOCUSING:

- Front element rotates/extends
- Slower operation

# The Invisible Wall



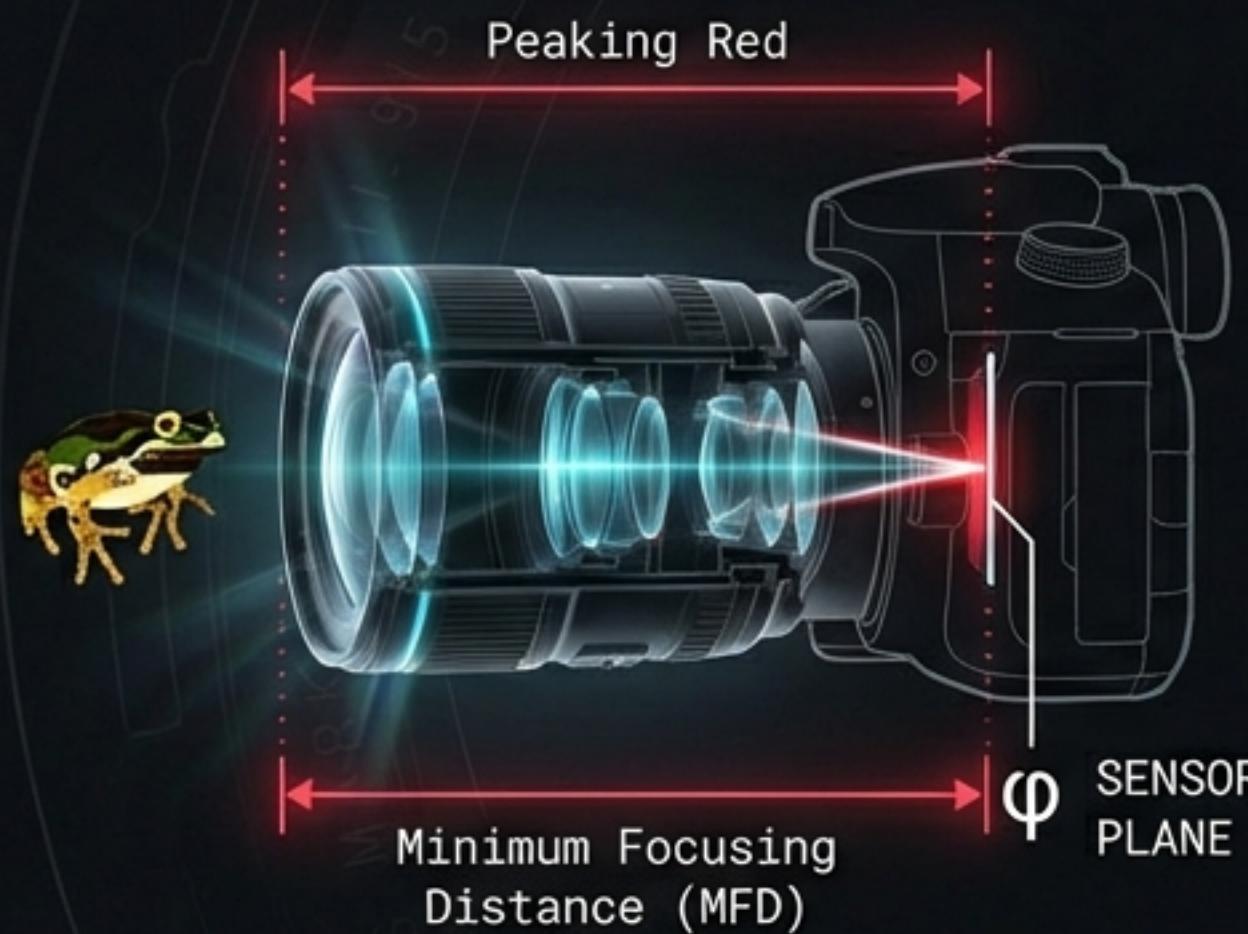
## The Plane of Focus:

A razor-thin, 2D sheet parallel to the sensor.

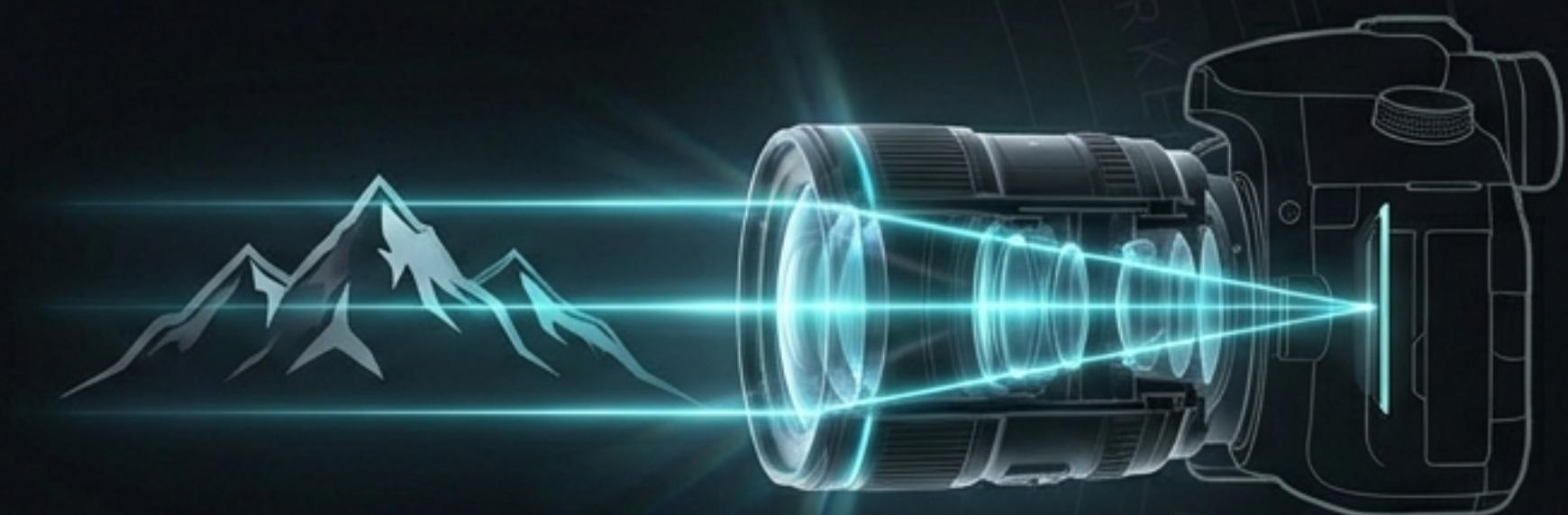
## The Law of Fall-off:

Sharpness degrades immediately in front of and behind this plane.

# From Here to Infinity



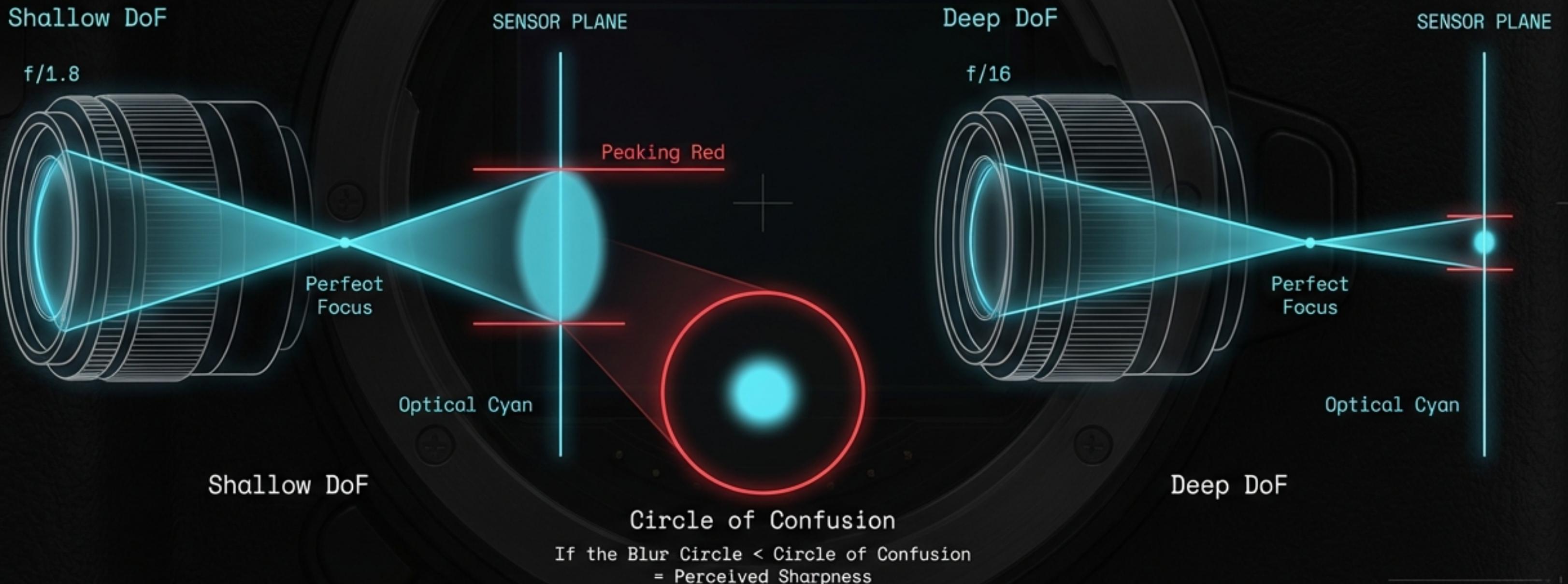
**MFD:** Measured from the Sensor Plane ( $\phi$ ), not the front glass.



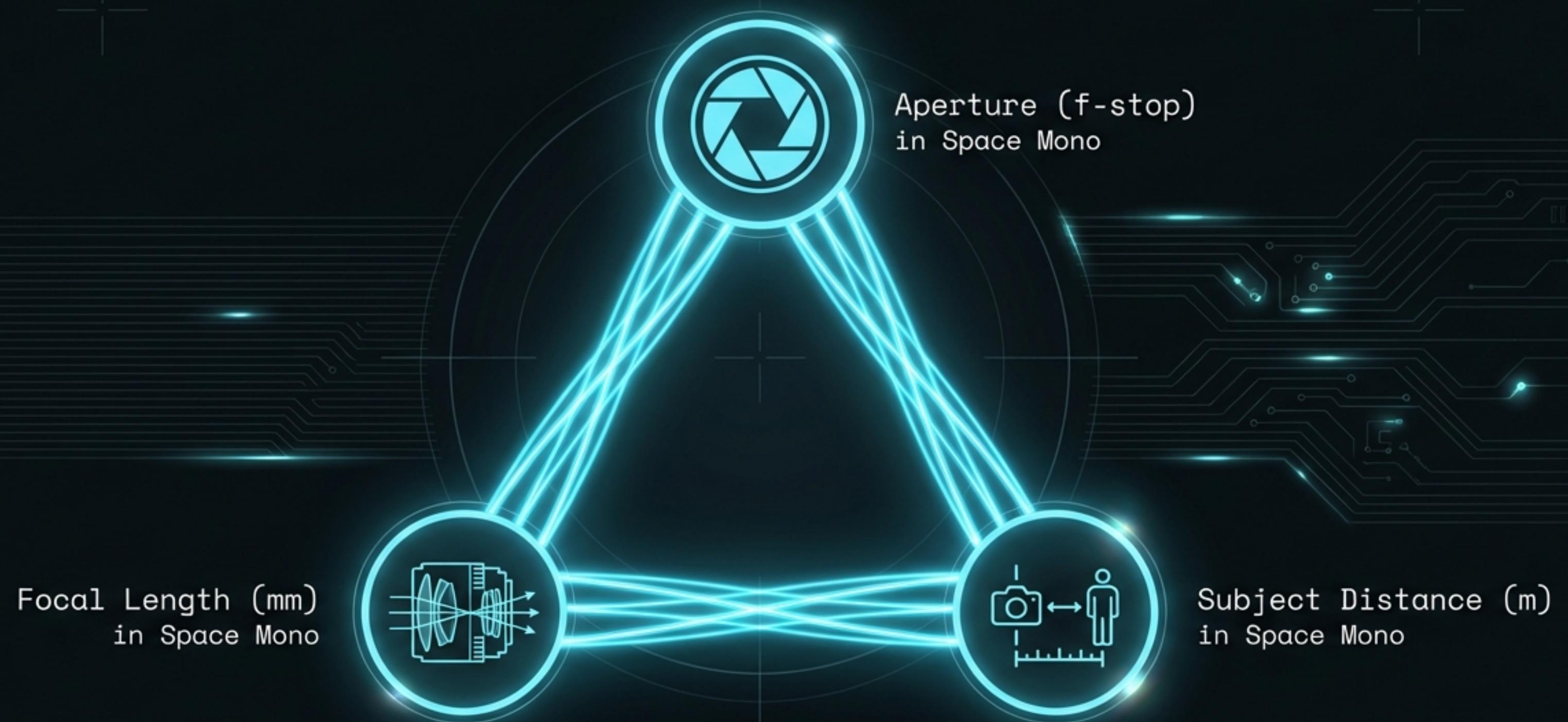
**Infinity:** Parallel light rays.  
Used for horizons and stars.

# The Zone of Acceptance

Depth of Field is a biological trick, not a physical reality.



# The DoF Trinity



Three levers working in unison to determine the thickness of the focus slice.

# Aperture & The f-stop Rule



f/1.8 (Wide Open)

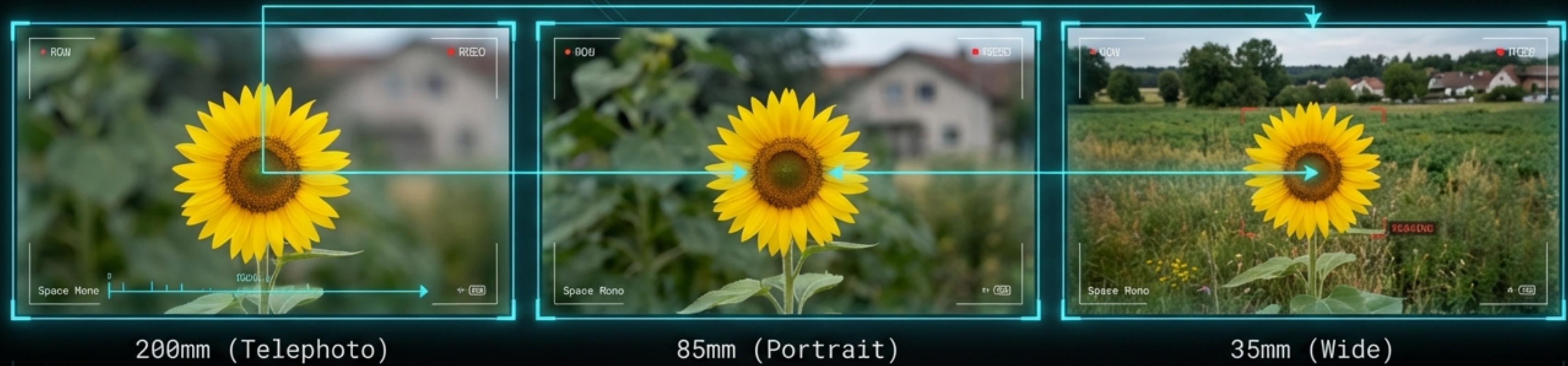
More Light /  
Shallow Focus



f/16 (Stopped Down)

Less Light /  
Deep Focus

# Compression & Perspective



200mm (Telephoto)

85mm (Portrait)

35mm (Wide)

**Pro Tip:**

**Hyperfocal Distance:** The focusing point that maximizes depth of field from half the distance to infinity. Essential for landscapes.

# Man vs. Machine

AF-C

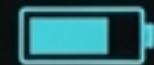
**PHASE DETECTION:** Fast, tracks action.  
**EYE-AF:** AI-driven subject recognition.



1/4000s

EYE TRACK

ISO 800



AUTO FOCUS

MF

**MANUAL FOCUS:** No hunting, absolute control.  
**Use for:** Macro, Low Light, Creative Decisions.



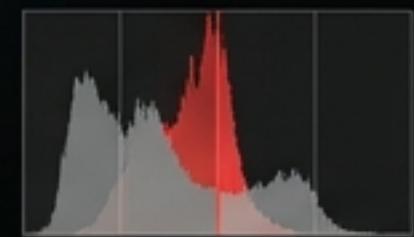
F/1.4

PEAKING: ON

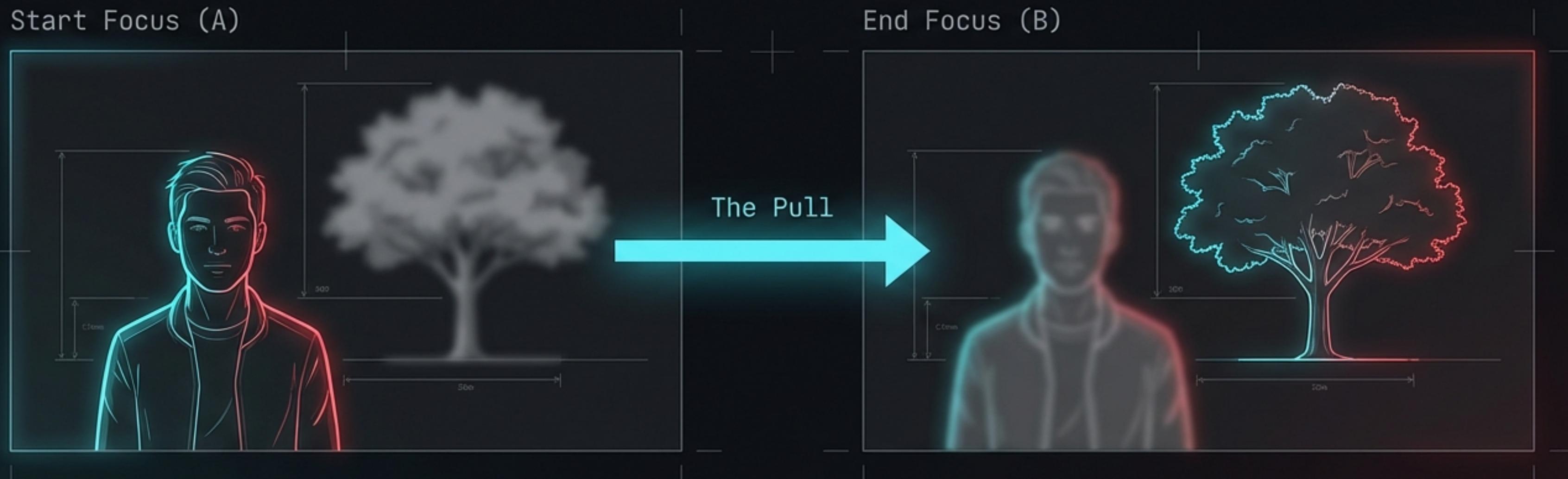
FOCUS: 0.5m

ISO 1600

MANUAL FOCUS



# The Cinematic Move: Rack Focus



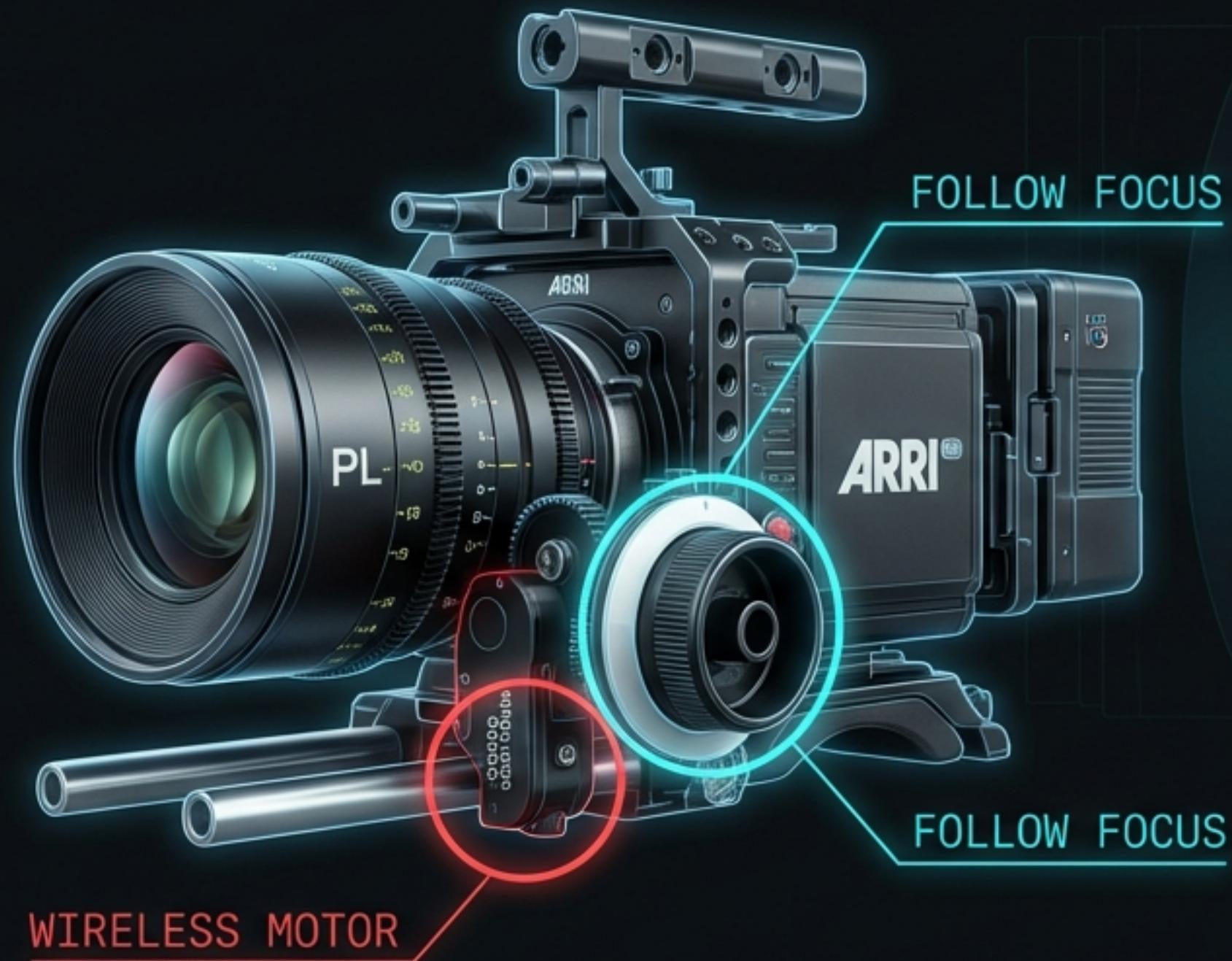
Guiding the Audience: A storytelling device to reveal new information or shift power dynamics.

# Focus Assist Tools



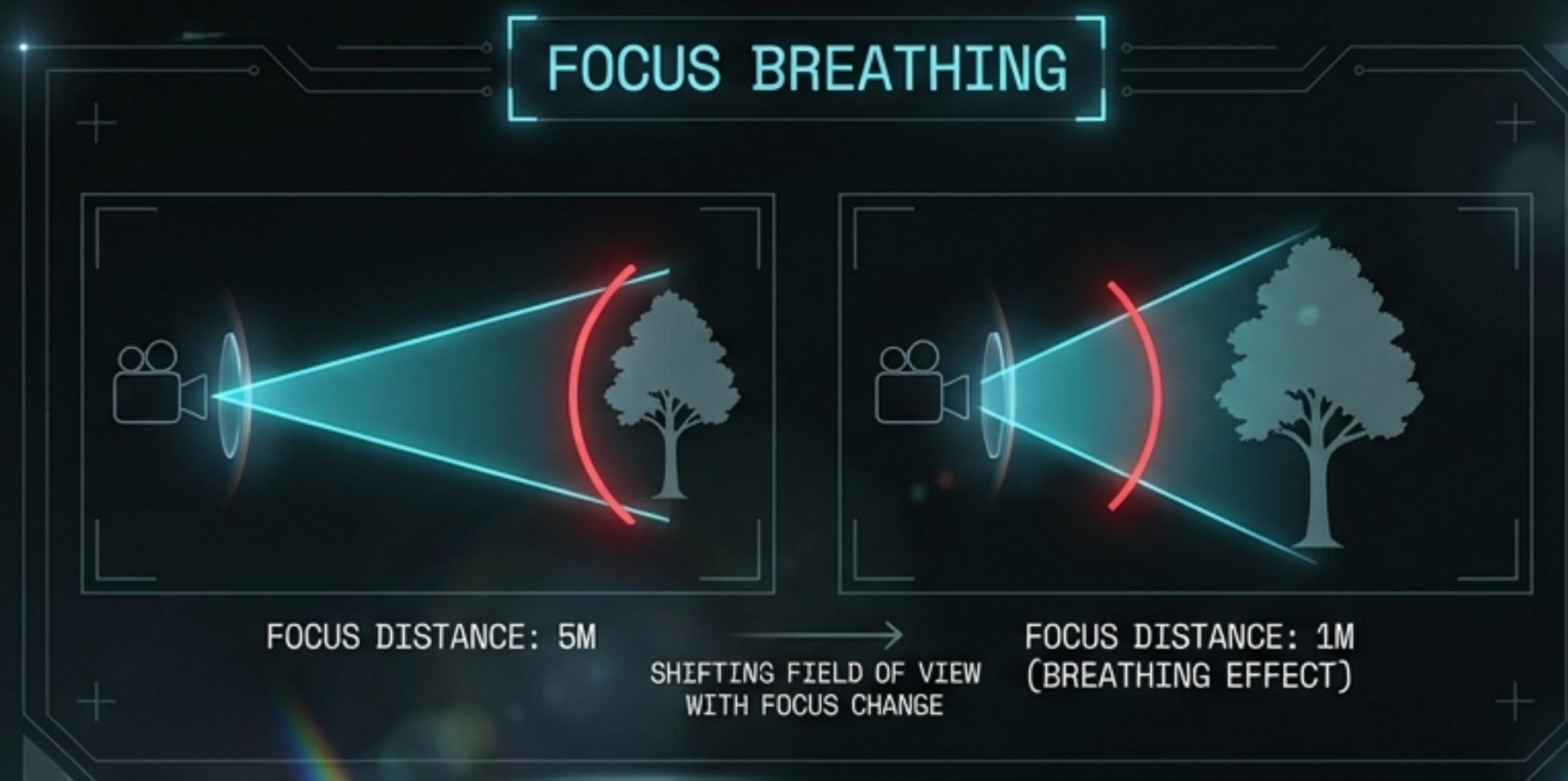
Digital aids ensure precision. You cannot fix out-of-focus footage in post-production.

# Professional Gear & The 1st AC



- THE 1ST AC (FOCUS PULLER): SOLE RESPONSIBILITY IS SHARPNESS.
- FOLLOW FOCUS: GEARED MECHANISM FOR SMOOTH, MARKABLE THROWS.
- WIRELESS SYSTEMS: ESSENTIAL FOR GIMBALS, CRANES, AND DRONES.

# ANOMALIES: BREATHING & SOFTNESS

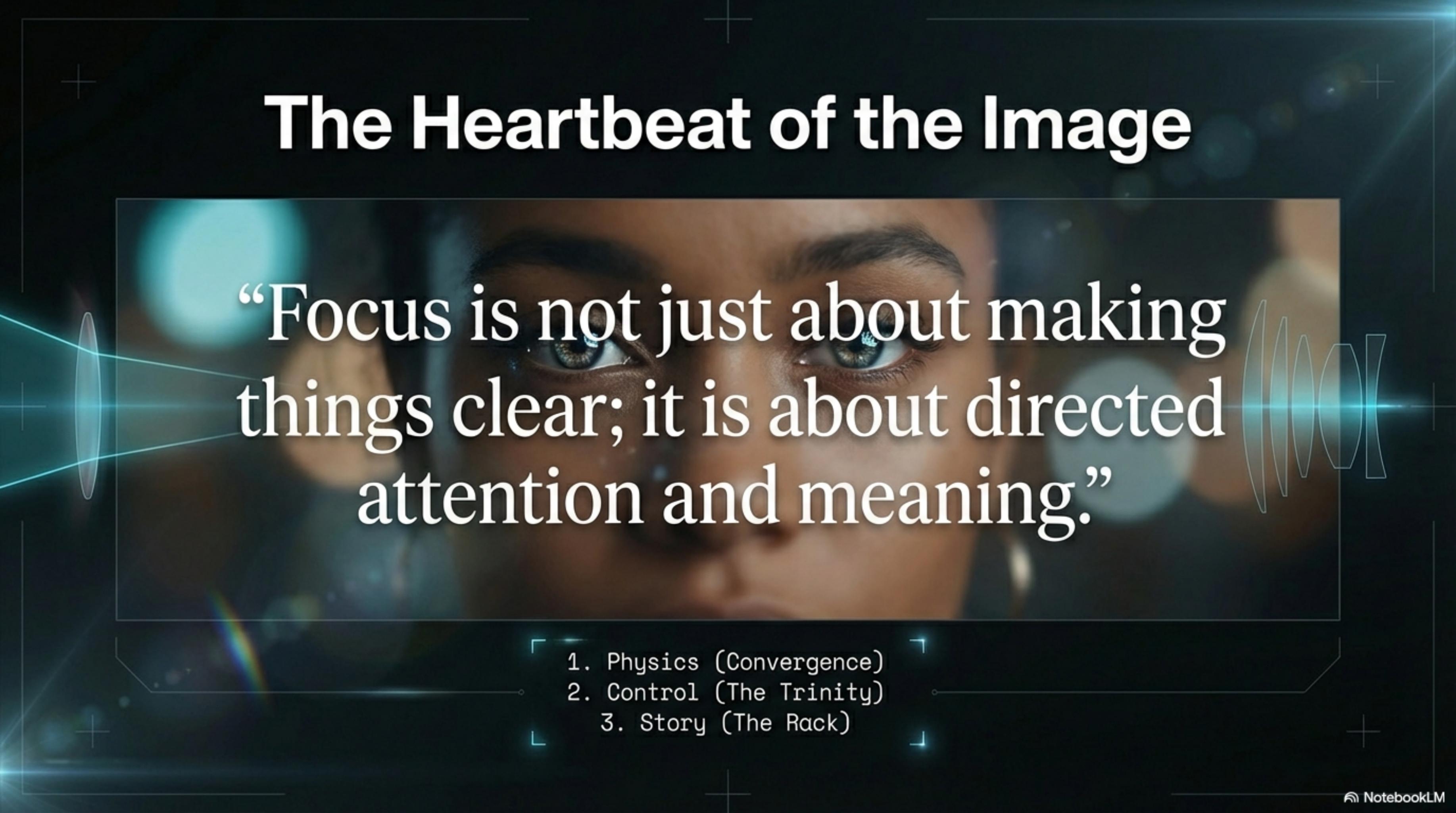


## SOFT FOCUS / DIFFRACTION

- CAUSE: LOW QUALITY GLASS OR EXTREMELY HIGH F-STOPS (F/22).
- SOLUTION: USE 'SWEET SPOT' APERTURES (F/5.6 - F/8) AND CINEMA LENSES.



# The Heartbeat of the Image



“Focus is not just about making things clear; it is about directed attention and meaning.”

- 1. Physics (Convergence)
- 2. Control (The Trinity)
- 3. Story (The Rack)