Visual comfort

- Key aspects of daylit environment
  - Visual performance
  - Physiological conditions
  - Visual quality

Visual comfort

- Key aspects of daylit environment
- Objectives
  - Harmonious luminance distribution (no strong contrasts)
  - Good color rendering (continuous spectrum, appropriate color T°)
  - Adequate illuminance level
  - No disturbing reflections
  - No direct glare

Visual comfort

- Key aspects of daylit environment
- Objectives
- Recommended illuminances

	Illuminance [lux]		
Type of space and function	Min	Mid	Max
Circulation, corridors, theatres, concert halls	50	100	200
Workshops, retail centres	200	300	400
Schools, offices, usual tasks, reading, writing, computer work, ...	300	400	500
Delicate work, drawing, technical tasks, ...	500	750	1000
Precision workshops, clockwork, color control, visual quality control, ...	1000	to	5000

Visual comfort

- Visual adaptation

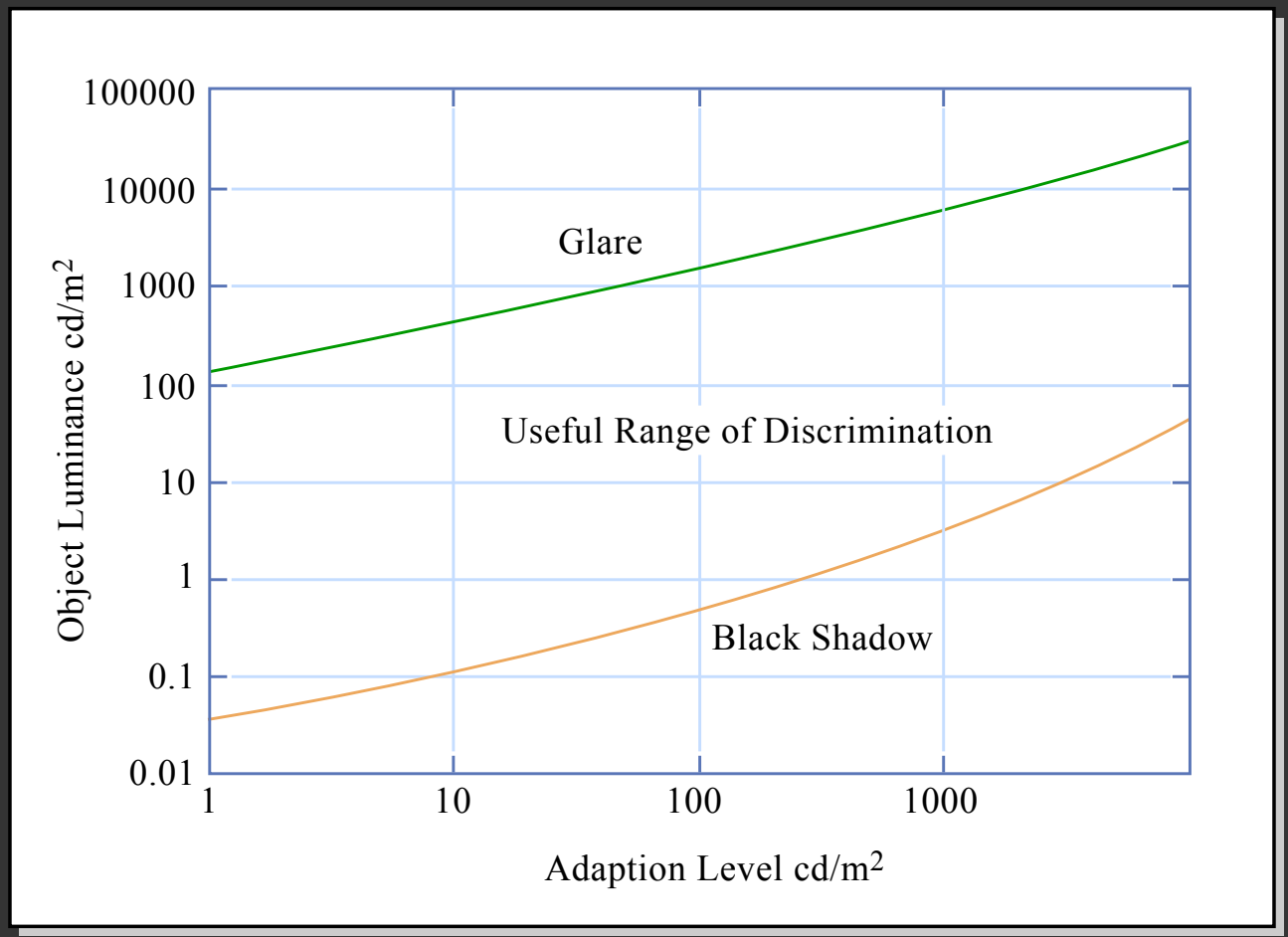

Image by MIT OCW.

Visual comfort

- Visual adaptation
- Visual field
  - central field (fovea)
  - ergorama (cones)
  - panorama (rods)

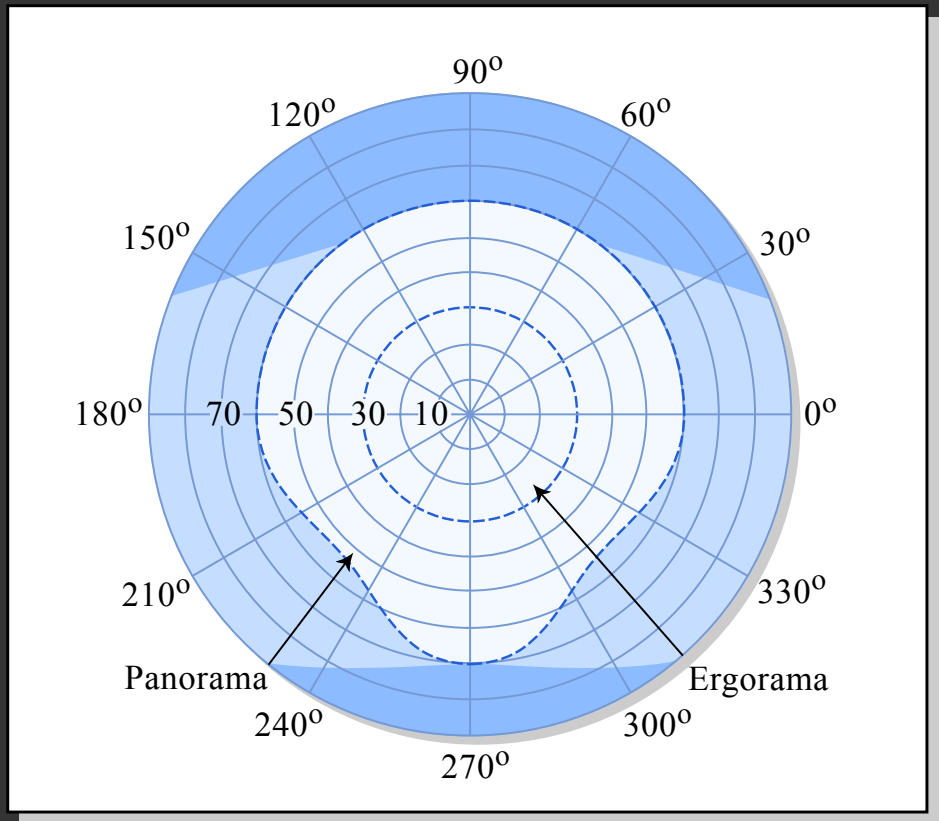

Image by MIT OCW.

Visual comfort

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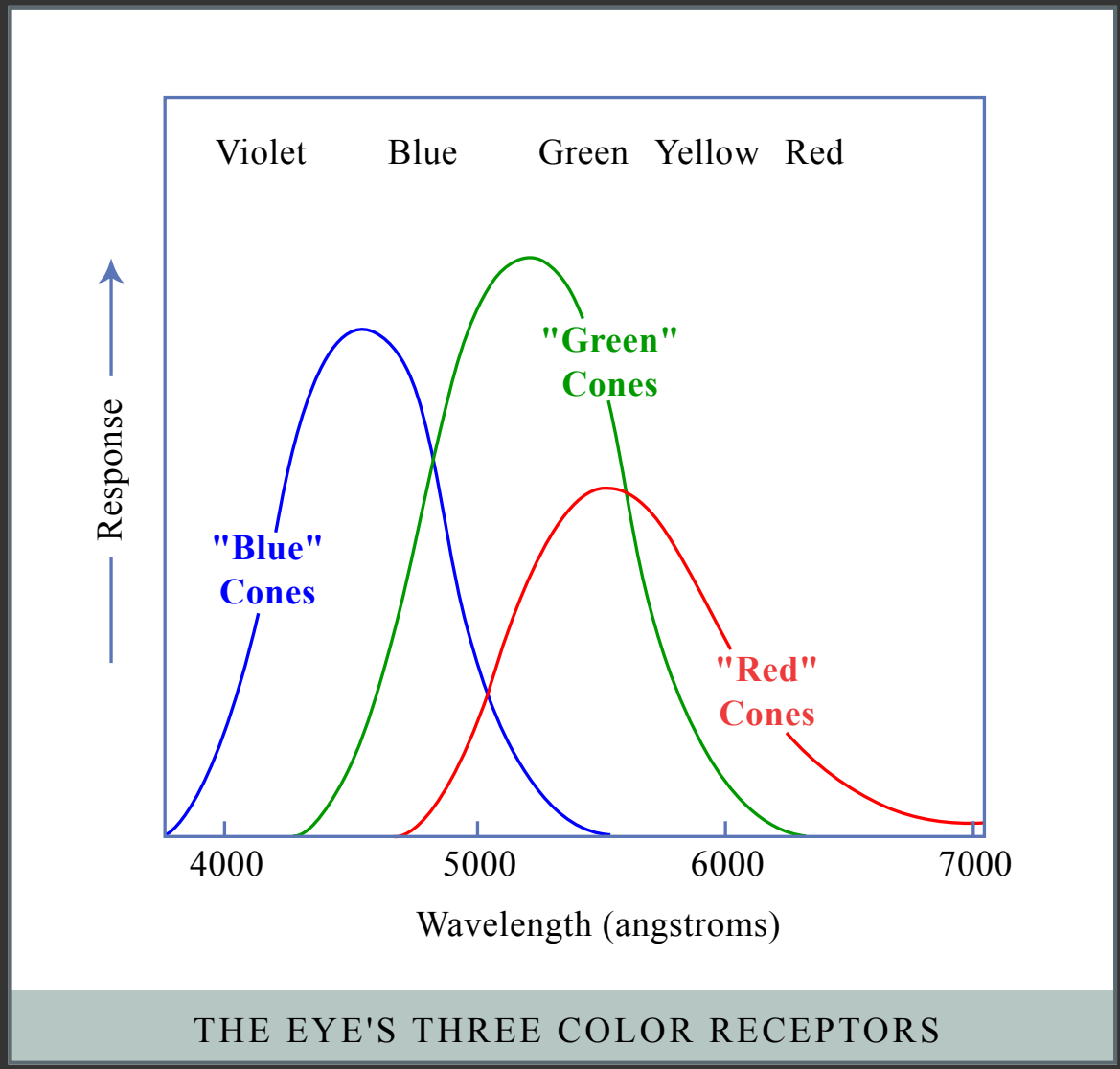

THE EYE'S THREE COLOR RECEPTORS

Visual comfort

- Visual adaptation
- Visual field
  - central field (fovea)
  - ergorama (cones)
  - panorama (rods)

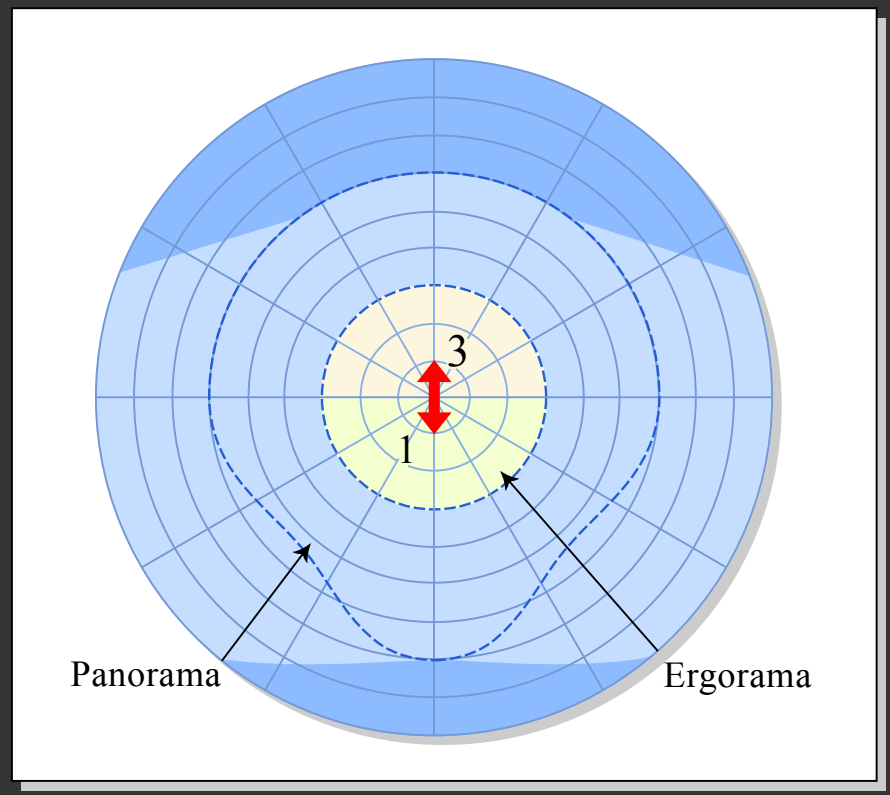

Image by MIT OCW.

Visual comfort

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  - central field (fovea)
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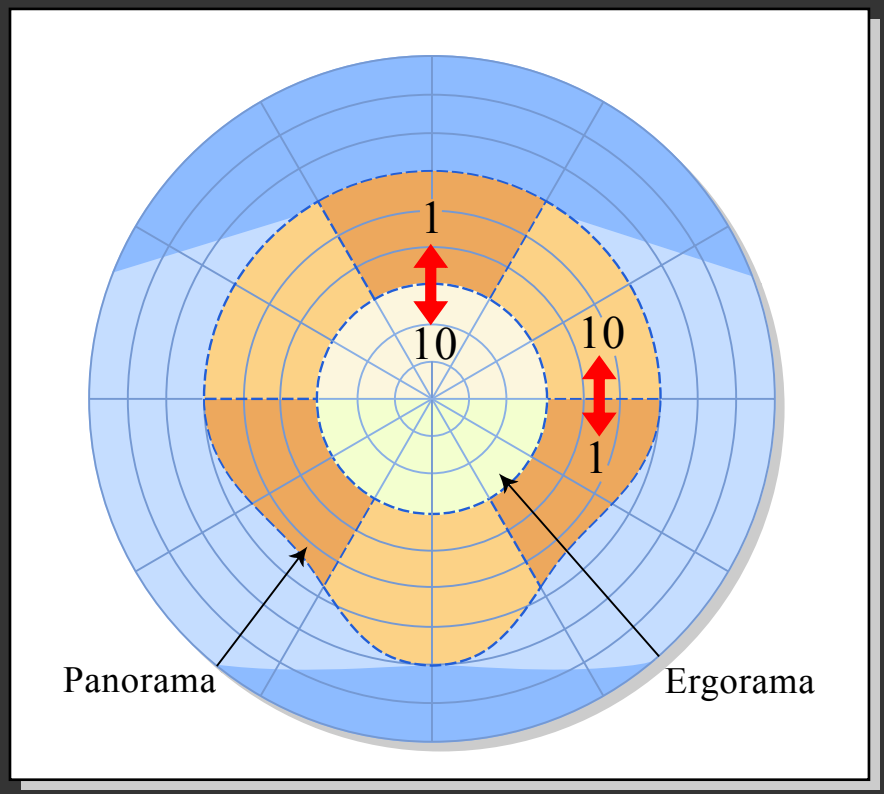


Image by MIT OCW.

Visual comfort

- Visual adaptation
- Visual field
- Visual performance
  - person & task
  - illuminance on work plane
  - luminance contrast
  - visual fatigue
  - example: work place

Visual comfort

- Visual adaptation
- Visual field
- Visual performance
- Glare
  - physiological (disability)
  - psychological (discomfort)

Visual comfort

- Visual adaptation
- Visual field
- Visual performance
- Glare
  - physiological (disability)
  - psychological (discomfort)
  - sources:
    - glazed openings & sun patches

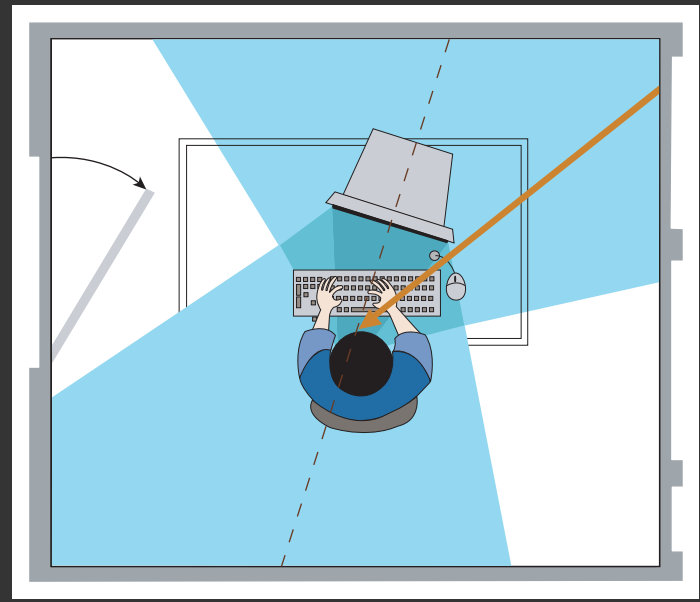


Image by MIT OCW.

Visual comfort

- Visual adaptation
- Visual field
- Visual performance
- Glare
  - physiological (disability)
  - psychological (discomfort)
  - sources:
    - glazed openings & sun patches
    - specular reflections

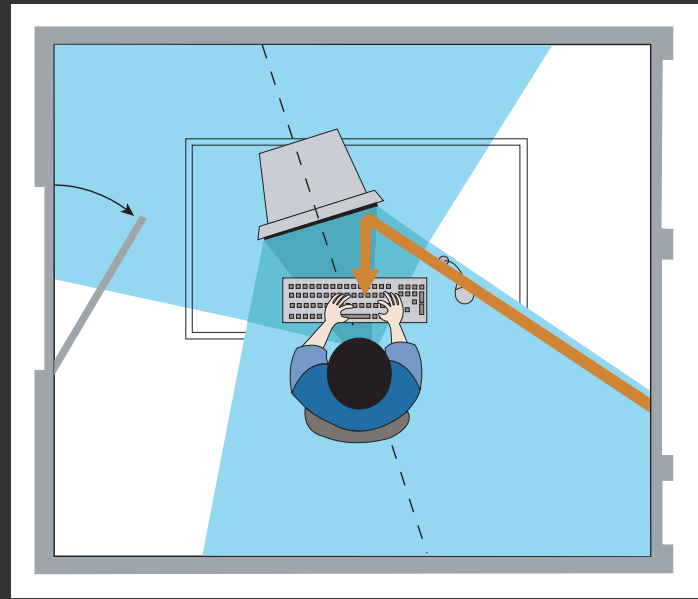


Image by MIT OCW.

Visual comfort

- Visual adaptation
- Visual field
- Visual performance
- Glare
  - physiological (disability)
  - psychological (discomfort)
  - sources:
    - glazed openings & sun patches
    - specular reflections
    - inappropriate electric lights

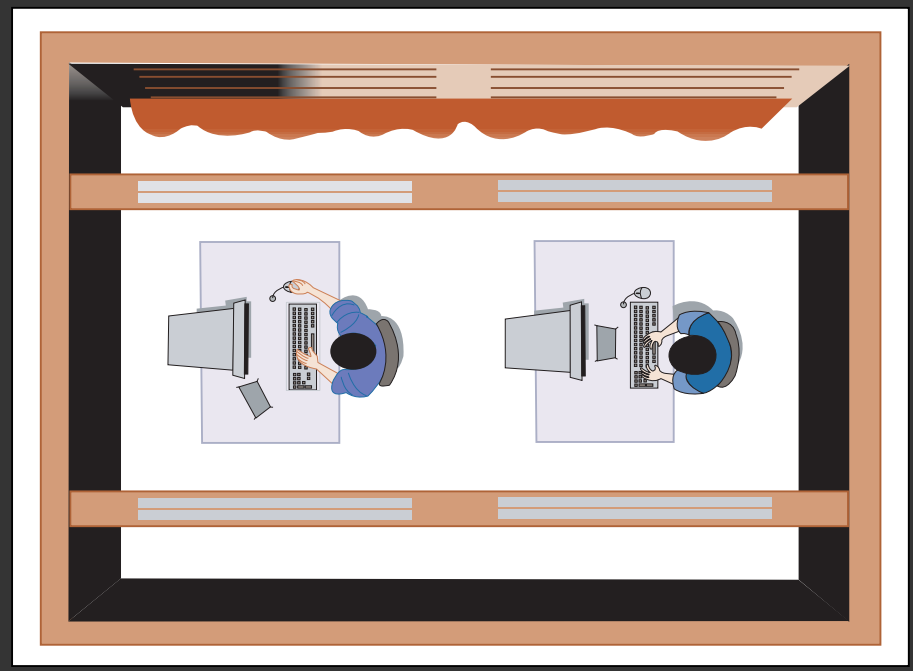


Image by MIT OCW.

Visual comfort

- Users' preferences
  - natural lighting
  - open view
  - visual effects
  - harmonious colors
  - specific conclusions
    - daylight
    - sunlight
    - windows

Color perception

- Apparent color depends on
  - observer

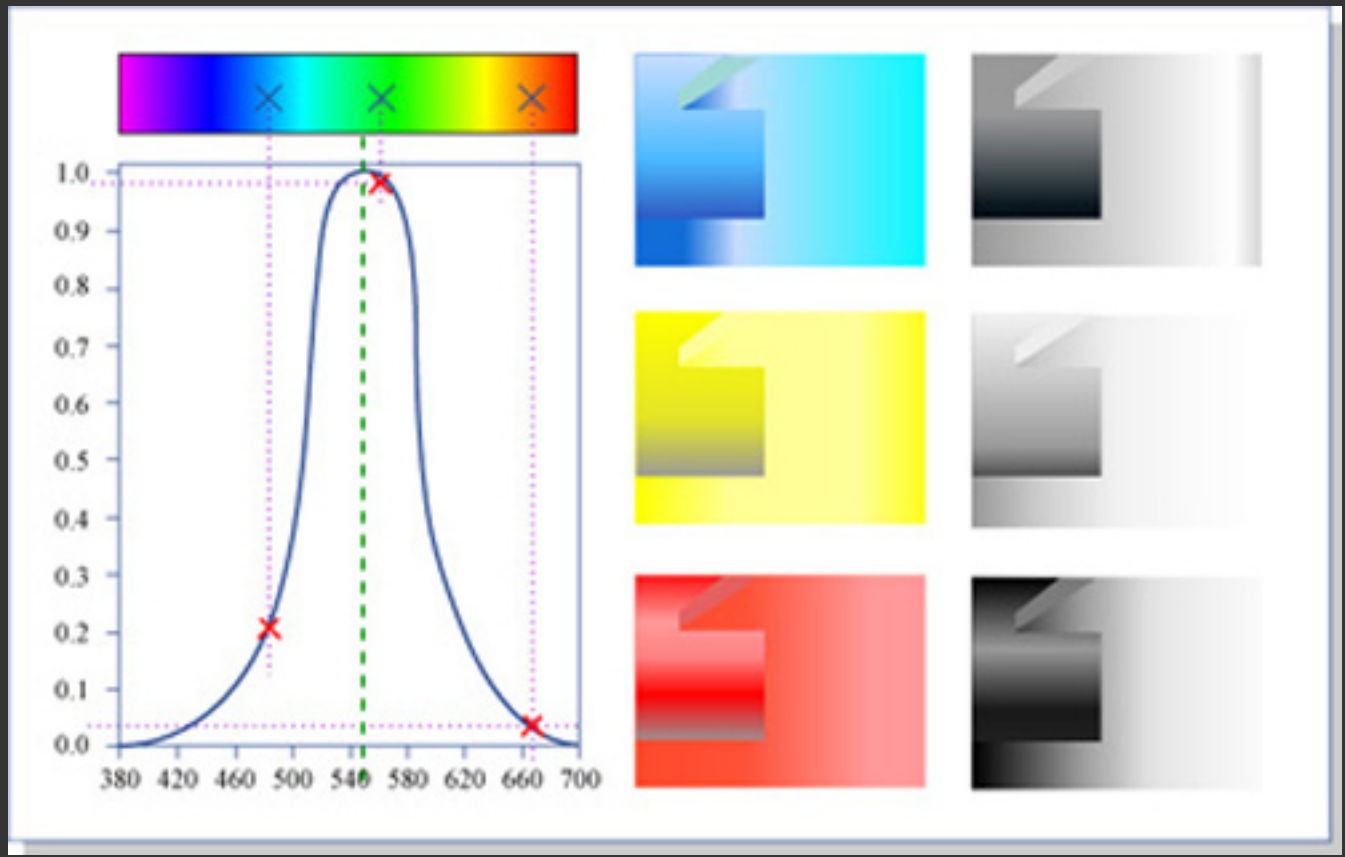


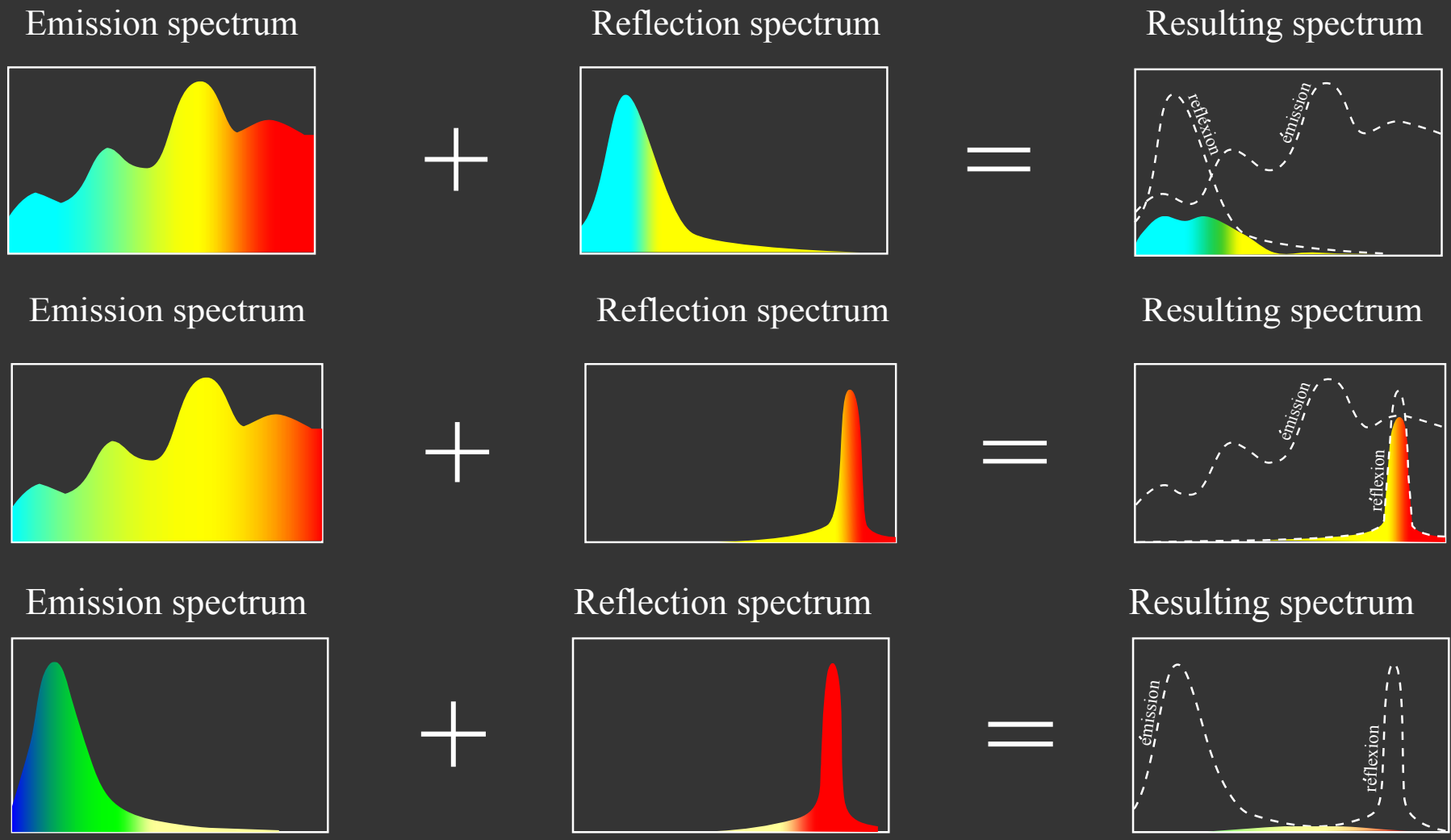
Image by MIT OCW.

Color perception

- Apparent color depends on
  - observer
  - intrinsic color of object
  - intrinsic color of source

Color perception

Apparent color



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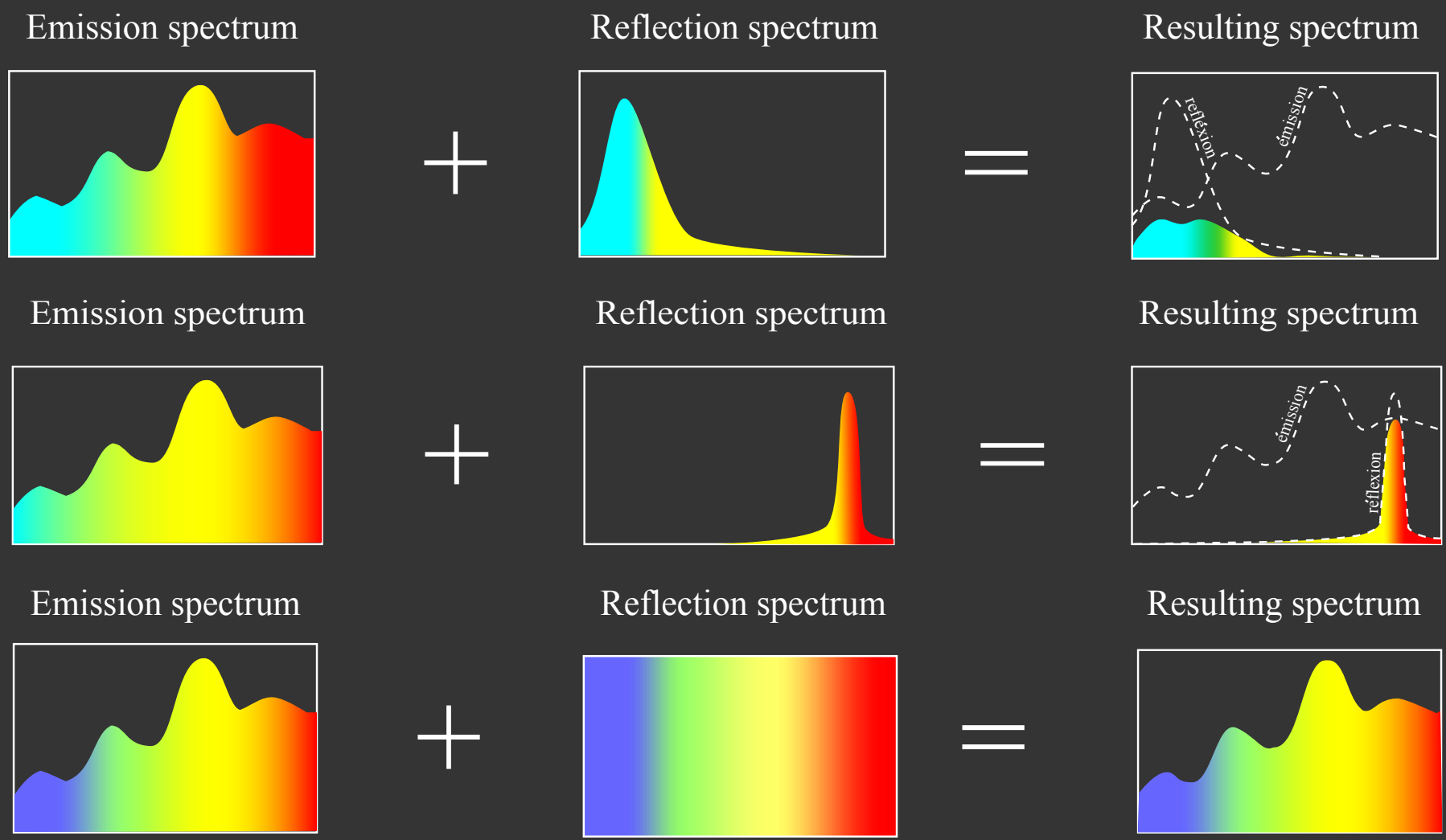
Color perception

Apparent color



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Color perception

- Apparent color

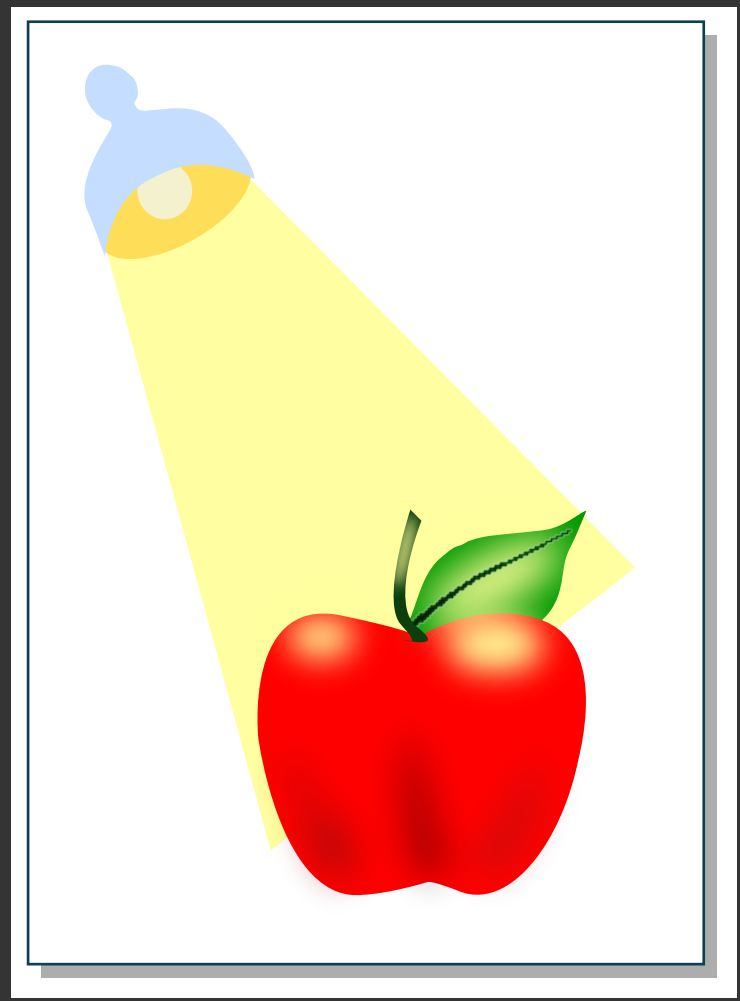
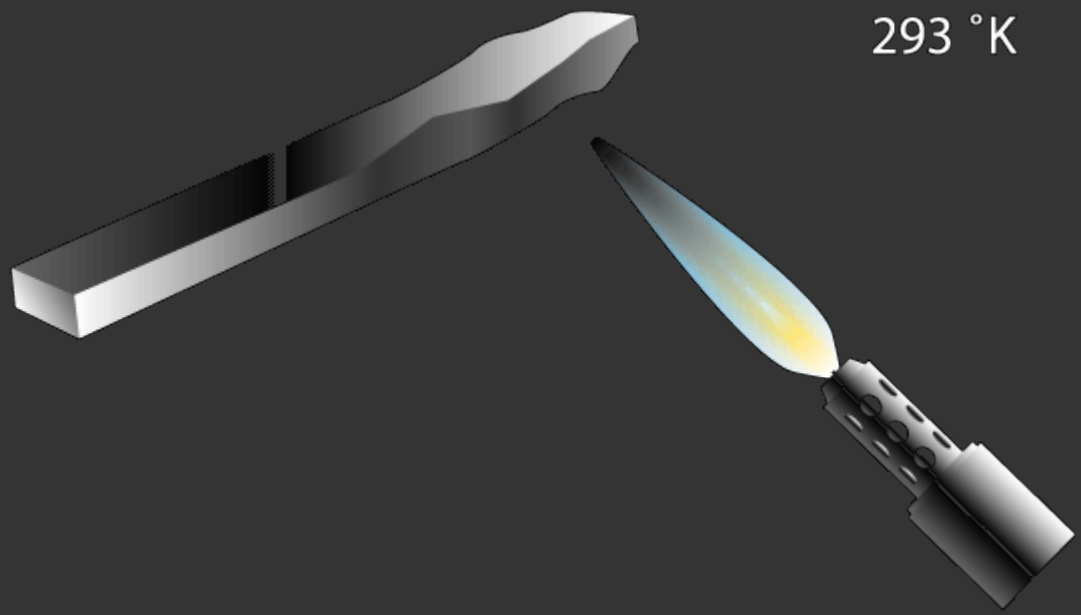


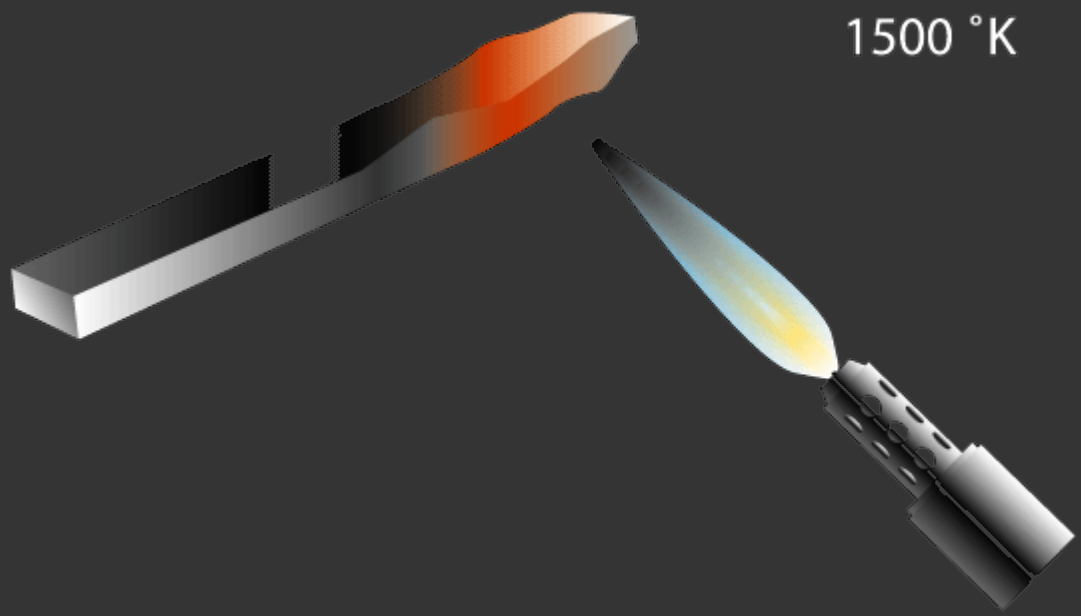
Image by MIT OCW.

Color temperature

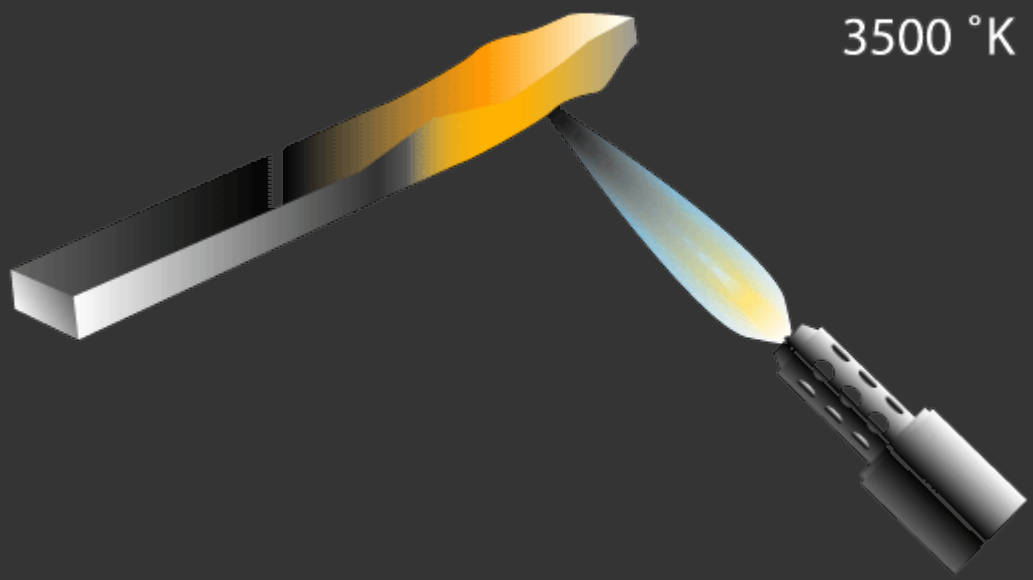
Color temperature



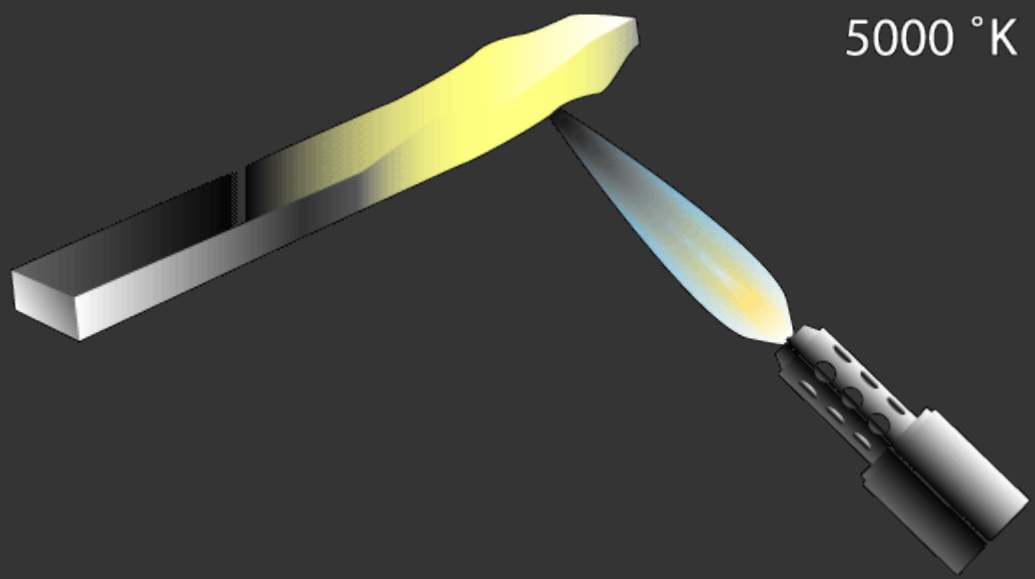
Color temperature



Color temperature

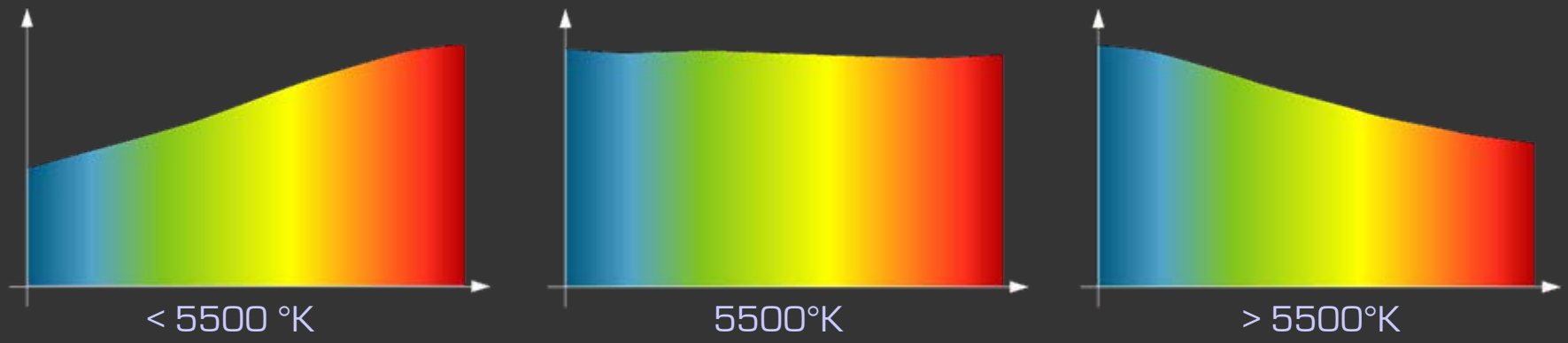


Color temperature



Color temperature

- Color temperature and visible emission



- Source requirements
  - continuous spectrum
  - color T° ≈ 5500°K
  - only fulfilled by daylight

Color temperature

- Color comfort

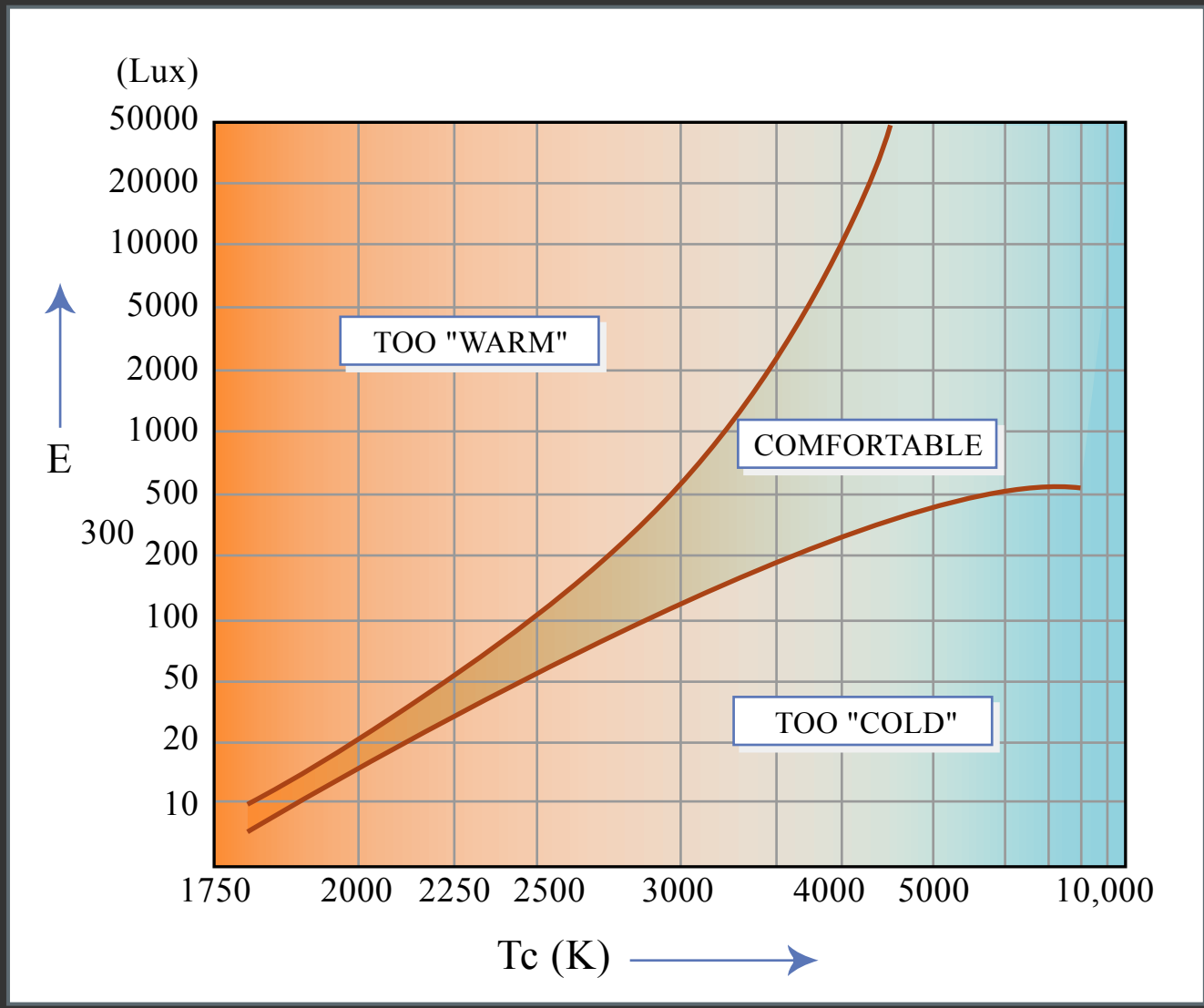


Image by MIT OCW.

Visual Comfort, Colors

- Reading assignment from Textbook:
  - “Introduction to Architectural Science” by Szokolay: § 2.2
- Additional readings relevant to lecture topics:
  - "How Buildings Work" by Allen: Chap 13
  - "Heating Cooling Lighting" by Lechner: Chap 12