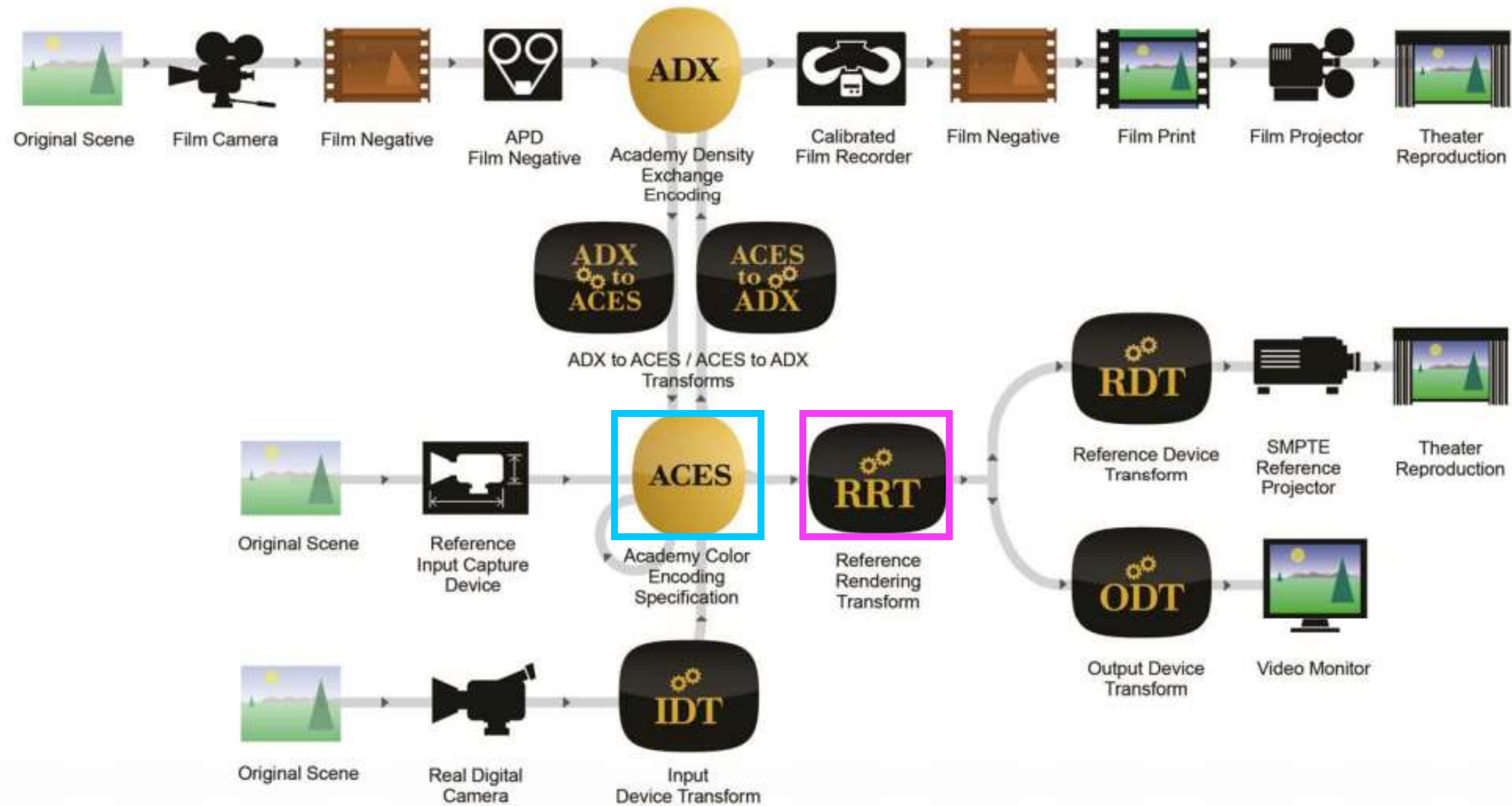


ACES で使いこなす CINEMA EOS SYSTEM

Logoscope

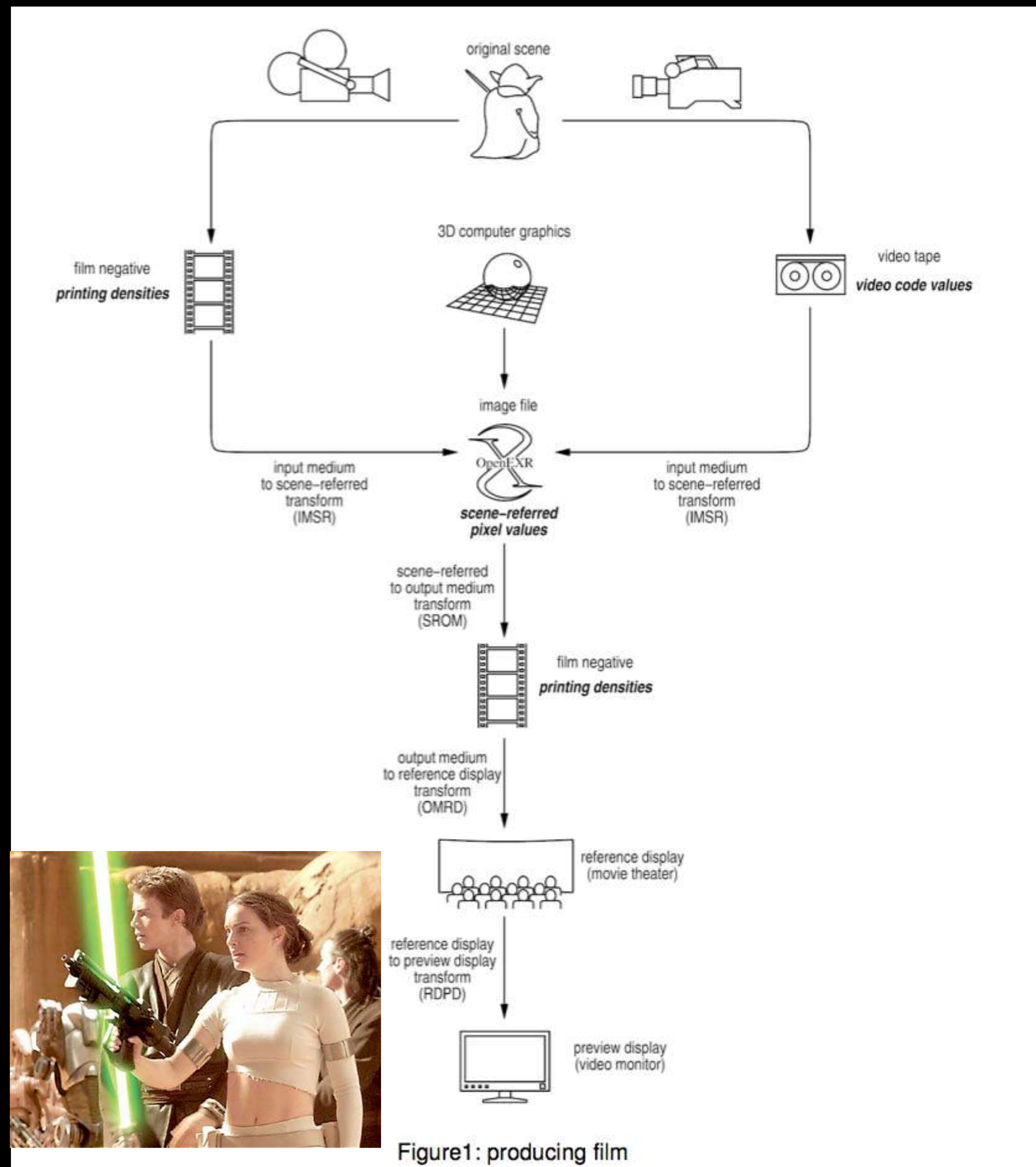
株式会社ロゴスコープ
代表取締役 亀村文彦

Academy Color Encoding System



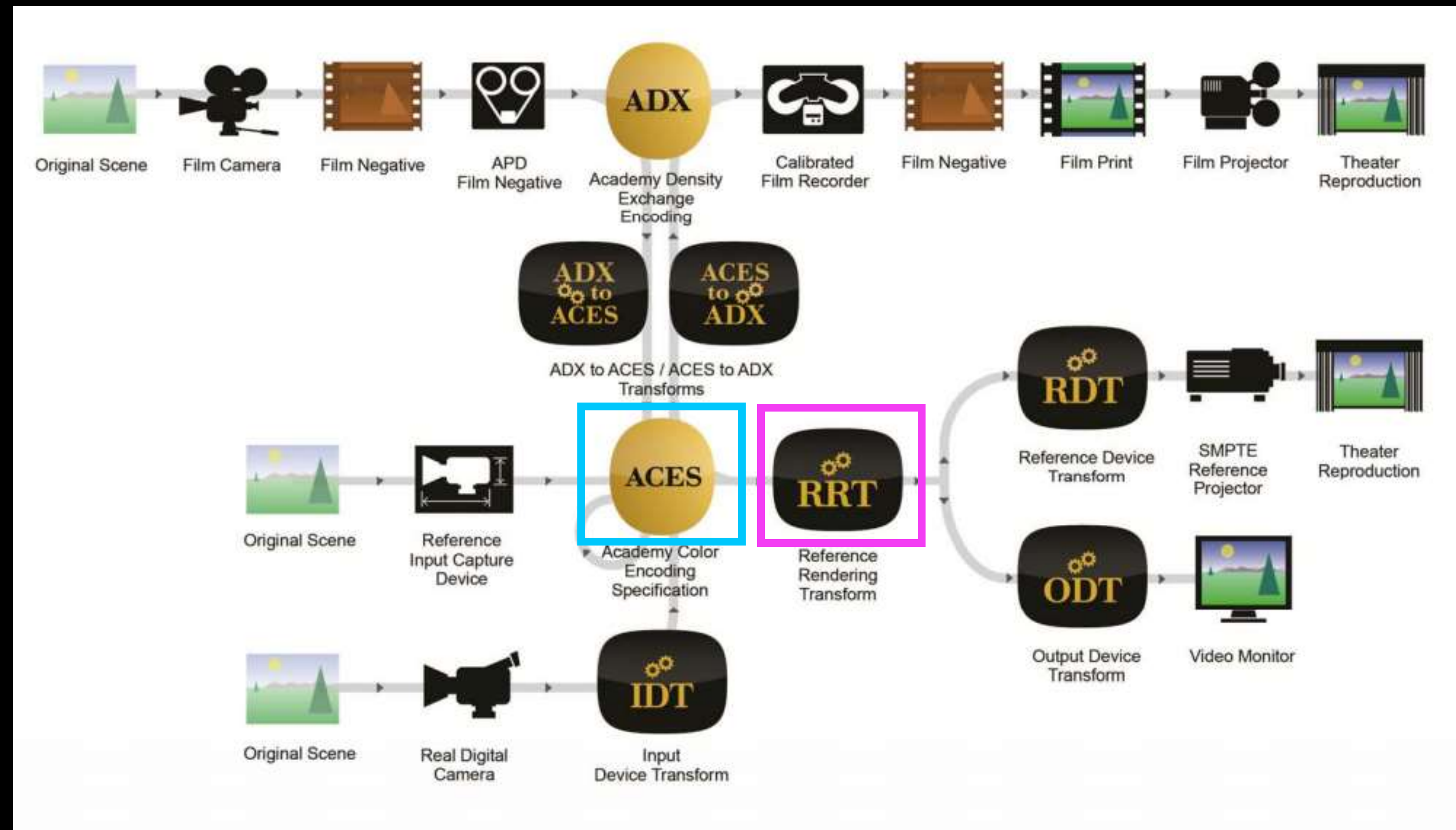
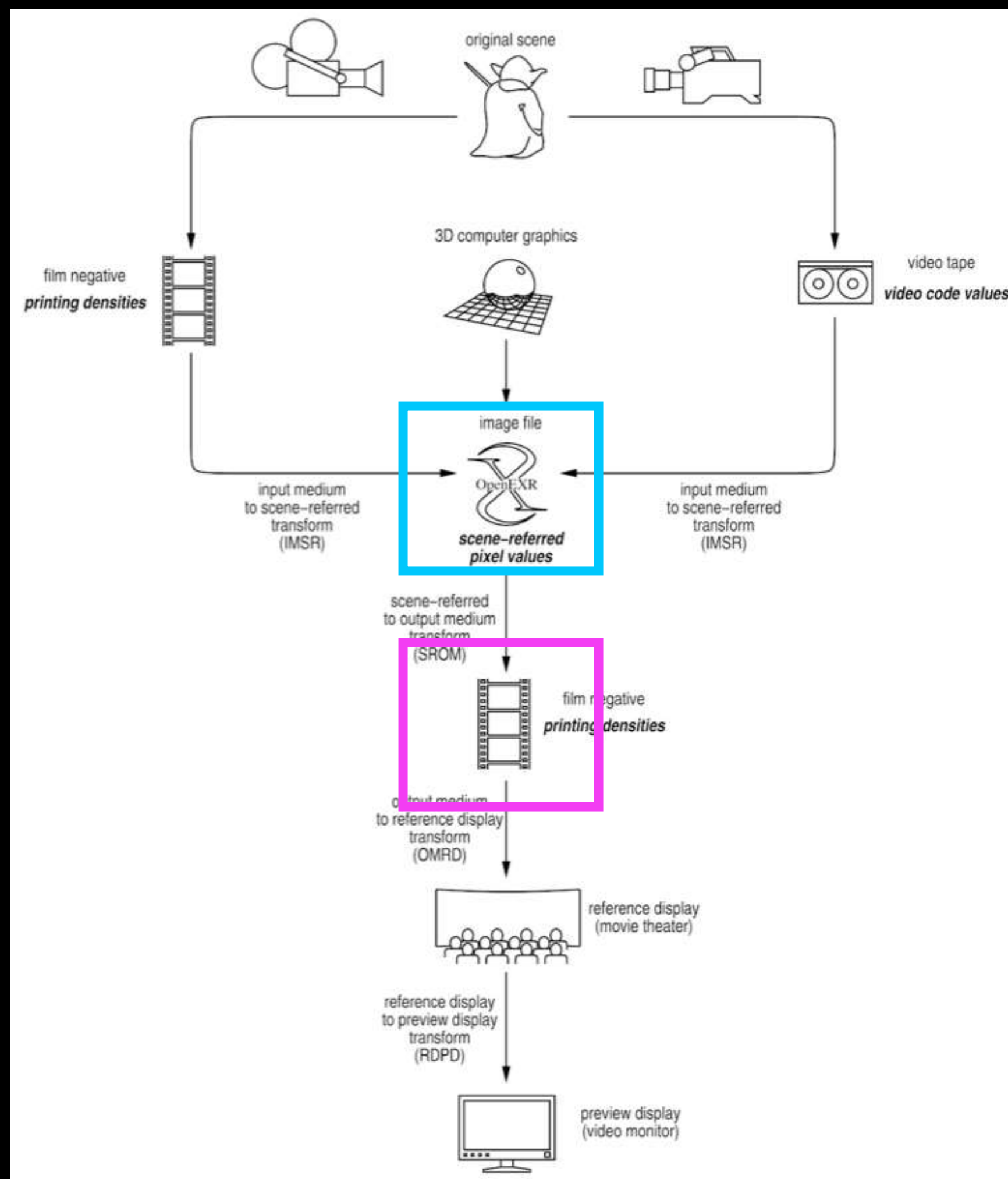
AMPAS が提案する、
ACESを用いたカラーパイプライン図, 2013
<http://www.oscars.org/science-technology/council/projects/pdf/ACESOverview.pdf>

Scene-linear Workflow/ACES



- ハリウッドで培われたフィルムとデジタルが混在するVFXのための映像制作技法 (カラーパイプライン)
- 汎用性の高い普遍的なワークフロー概念 (撮影, DIT, CGアーティスト, マットペインター, コンポジター, カラリスト, etc.)
- ACES (Academy Color Encoding System) として標準化 (SMPTE ST 2065-1:2012)

Scene-linear Workflow/ACES



AMPAS が提案する、ACESを用いたカラーパイプライン図, 2013

<http://www.oscars.org/science-technology/council/projects/pdf/ACESOverview.pdf>

Scene-referred Images

シーン参照画像

Scene-referred Images



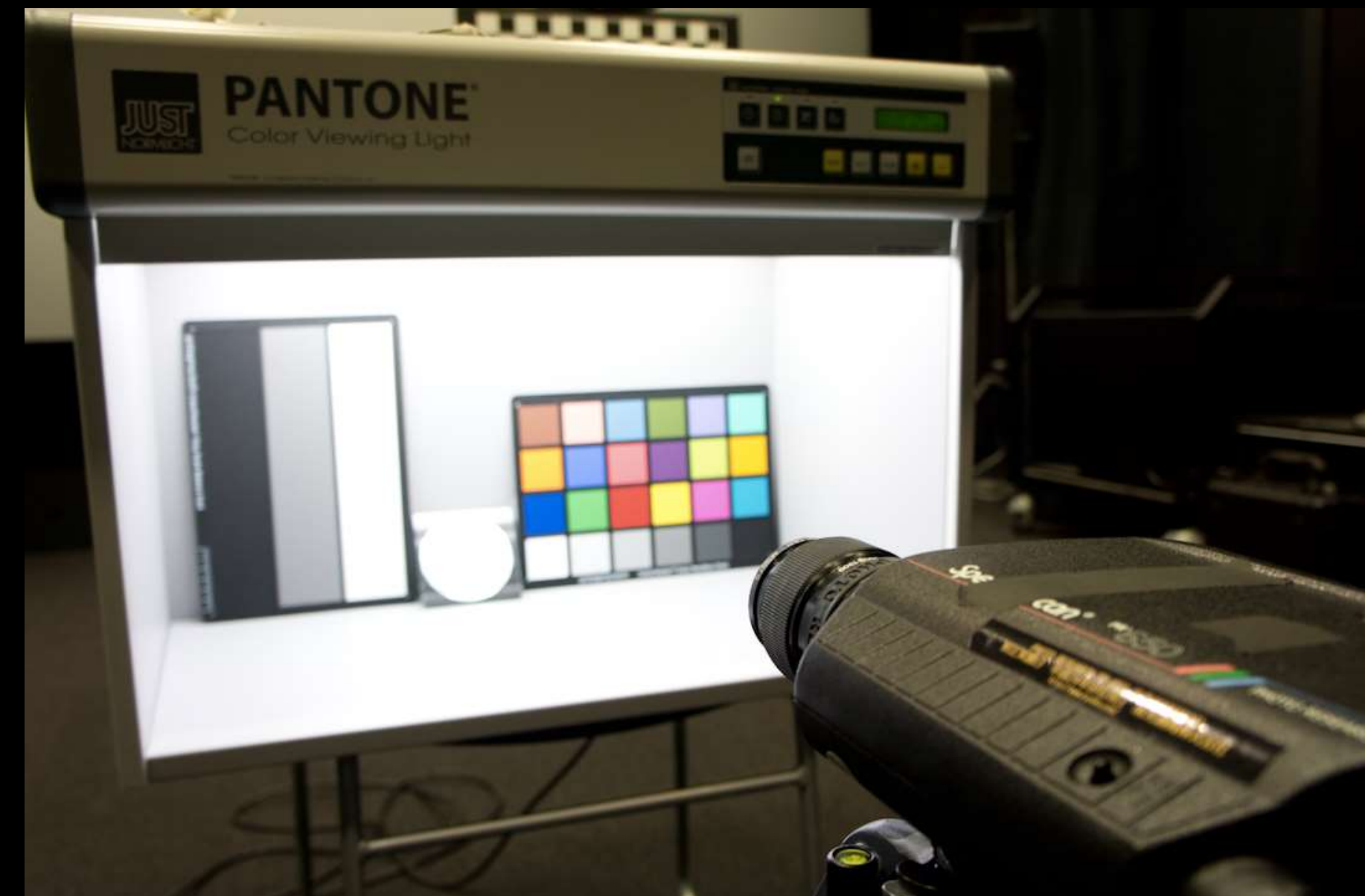
ACES Value

OpenEXR 16bit linear-half float

浮動小数点数

現実世界の輝度

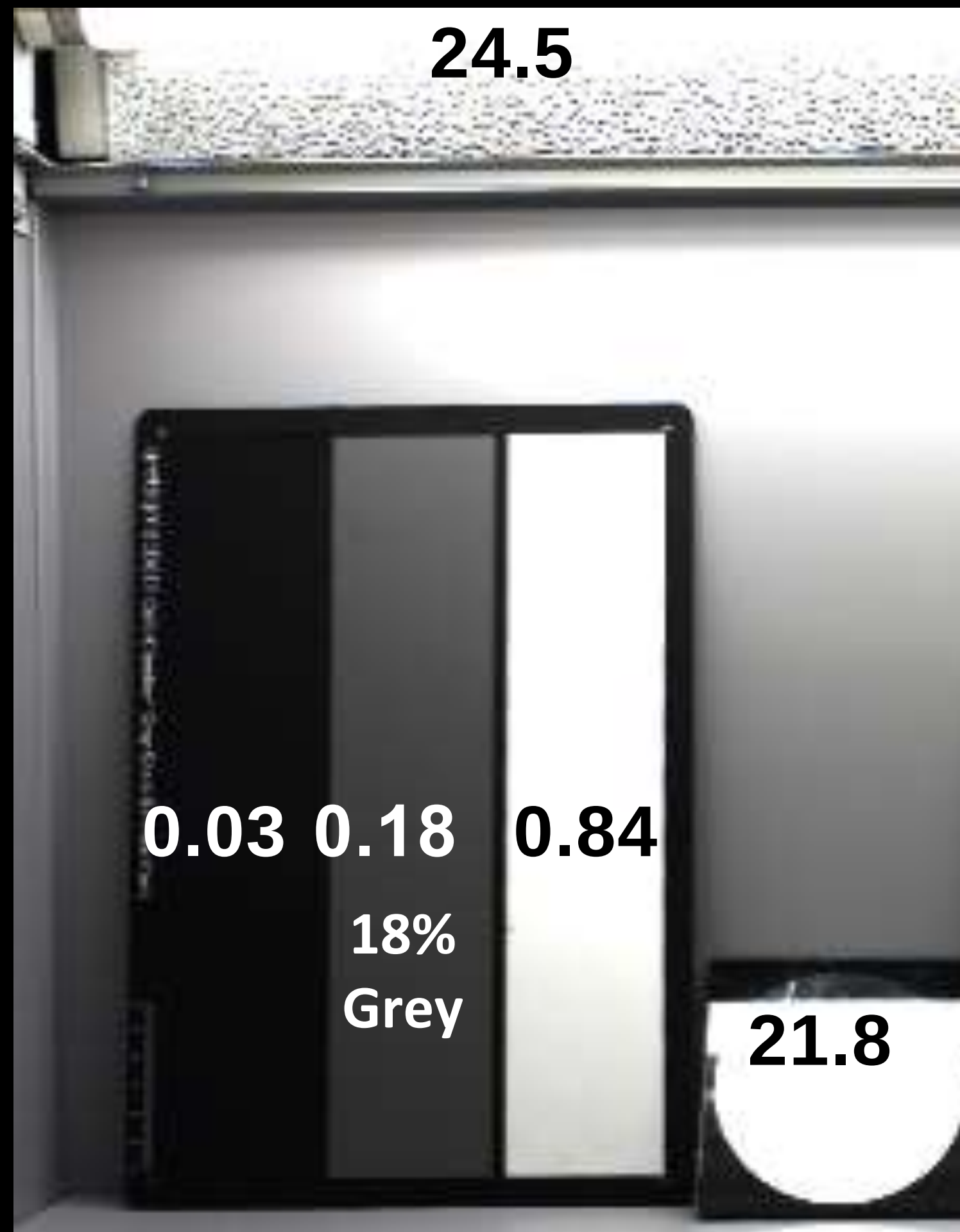
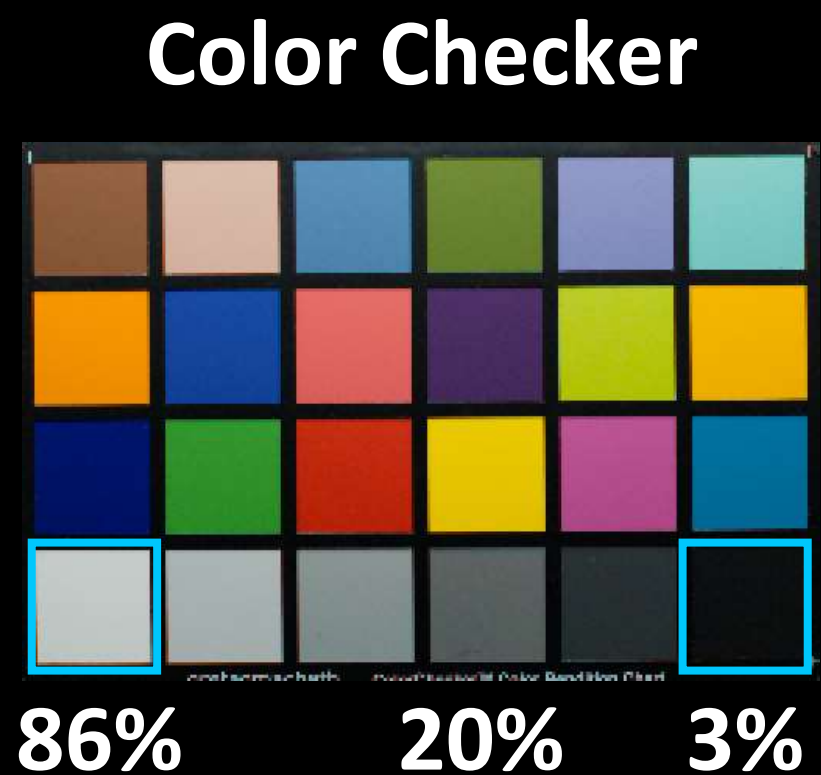
Photo Research PR-650 (分光測色機)



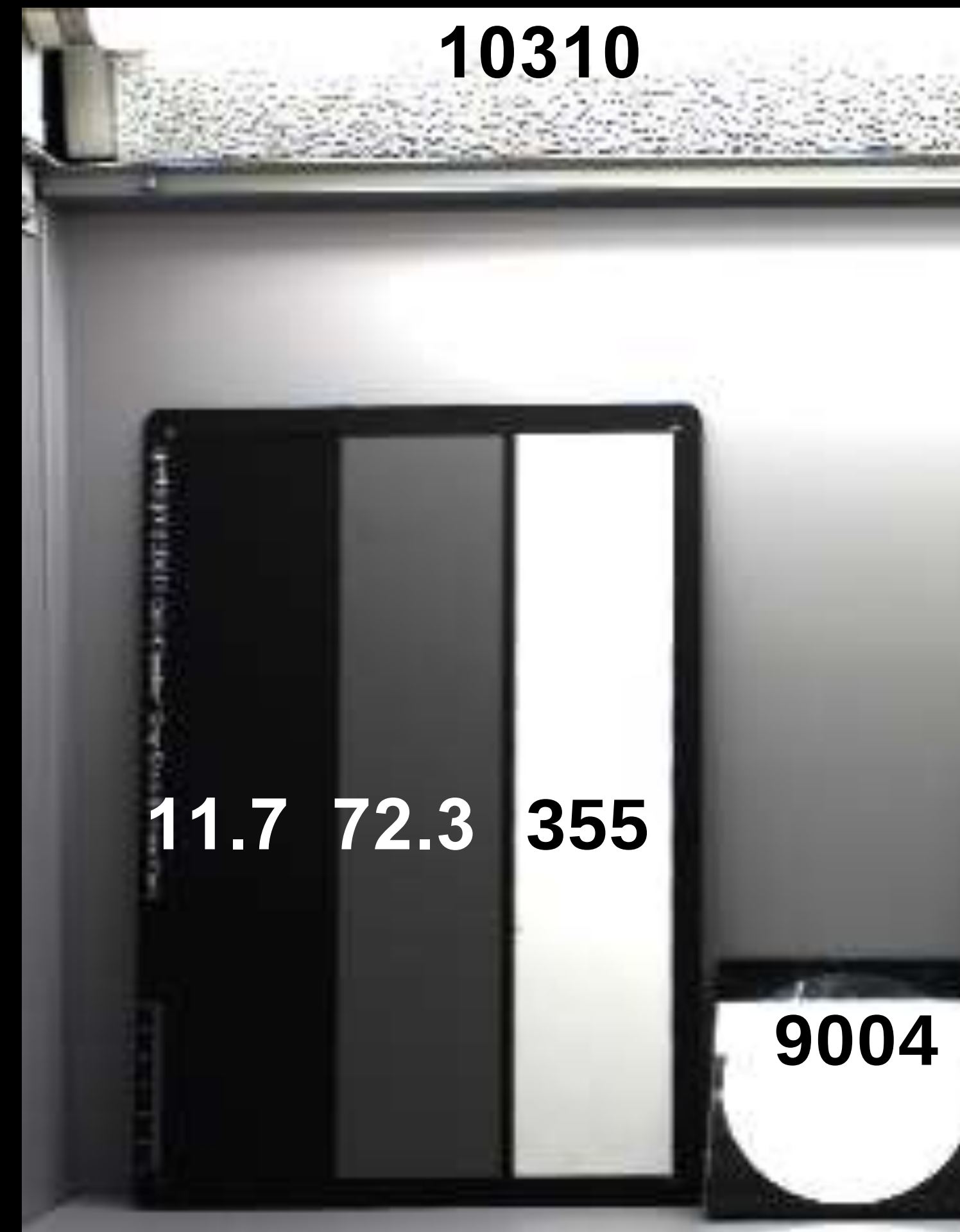
輝度 (cd/m²)



Scene-referred Images



ACES Value
OpenEXR 16bit linear-half float
浮動小数点数

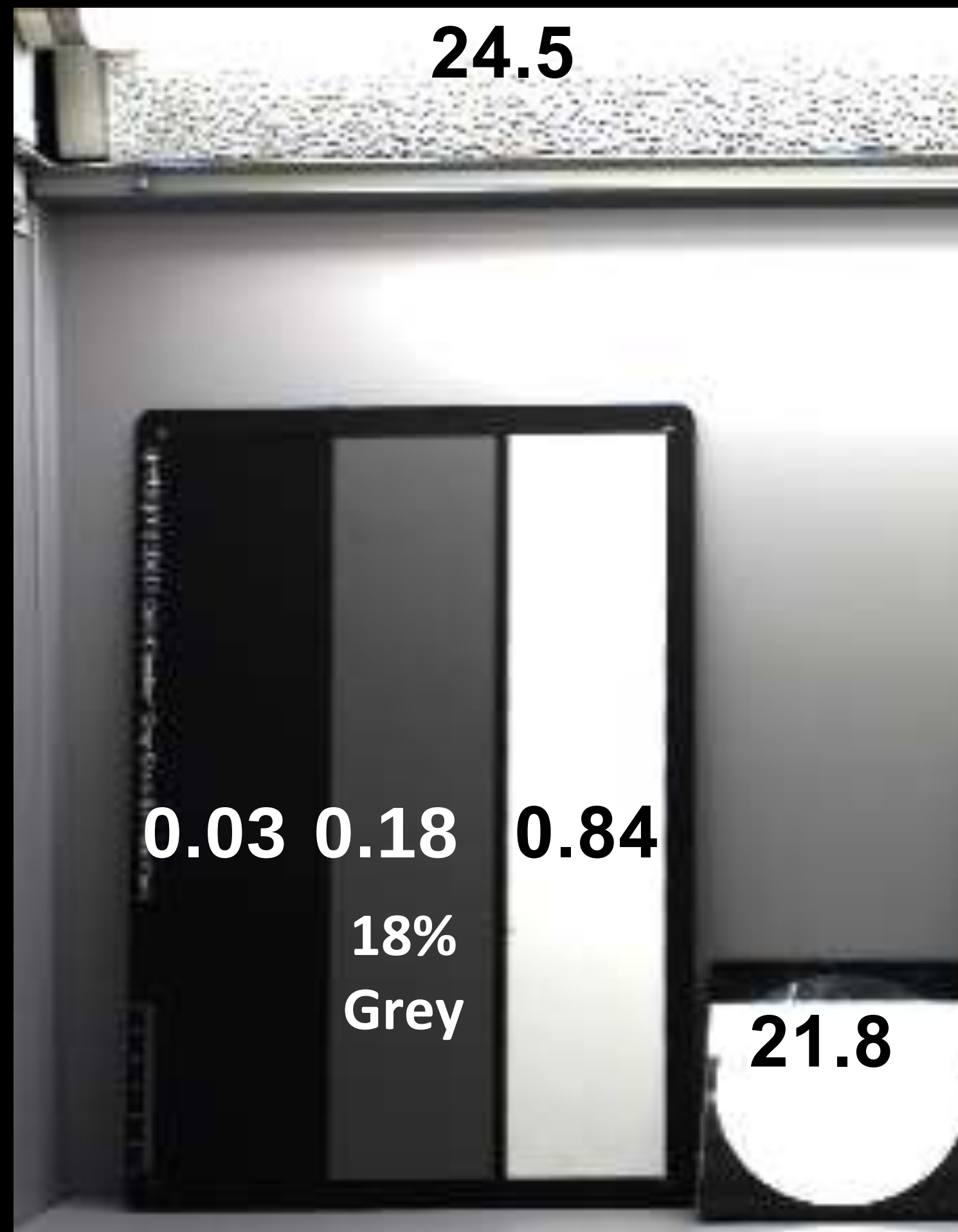
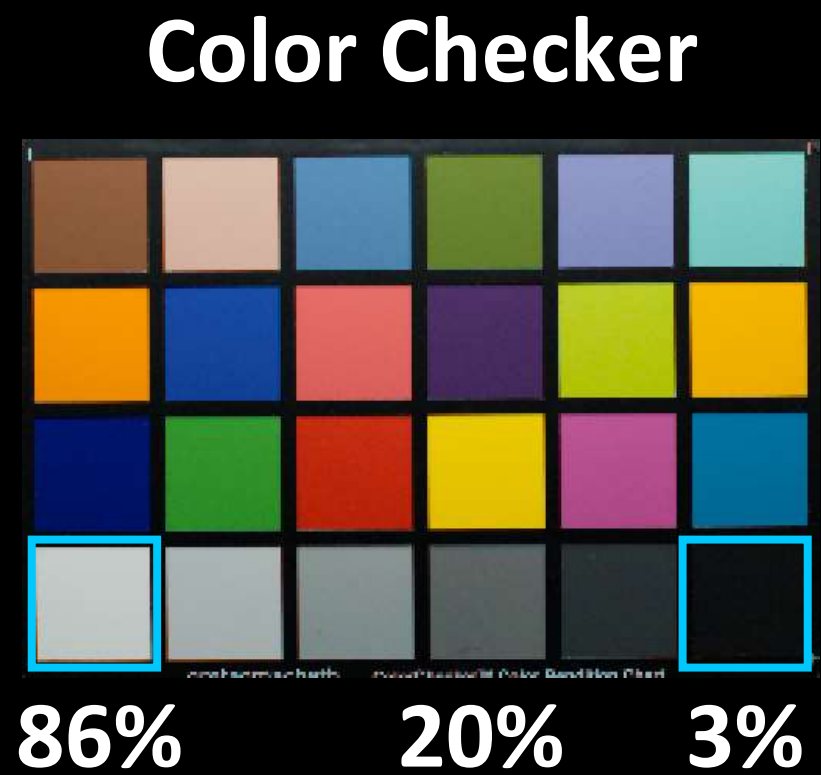


輝度 (cd/m²)

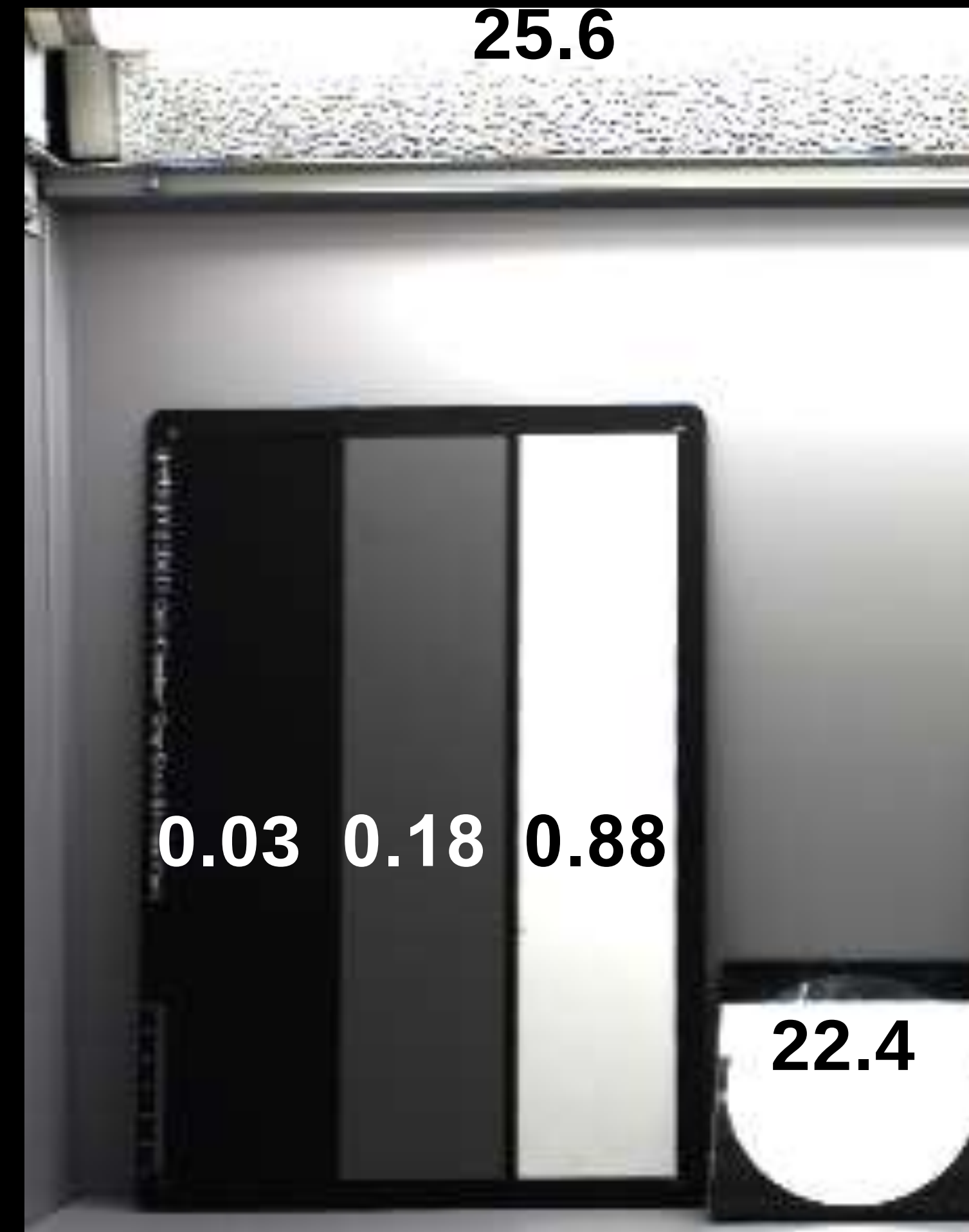


Spotmeter

Scene-referred Images



ACES Value
OpenEXR 16bit linear-half float
浮動小数点数



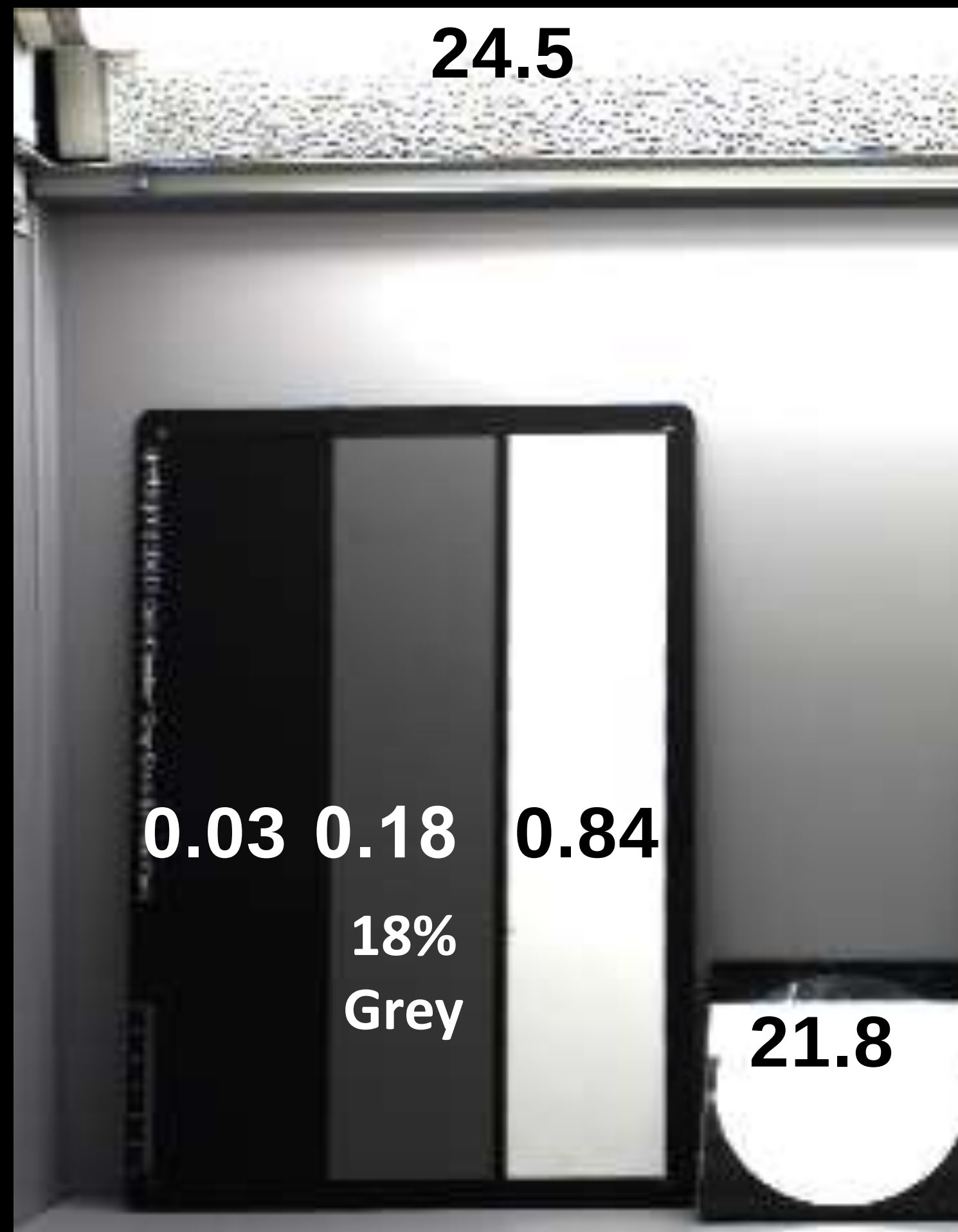
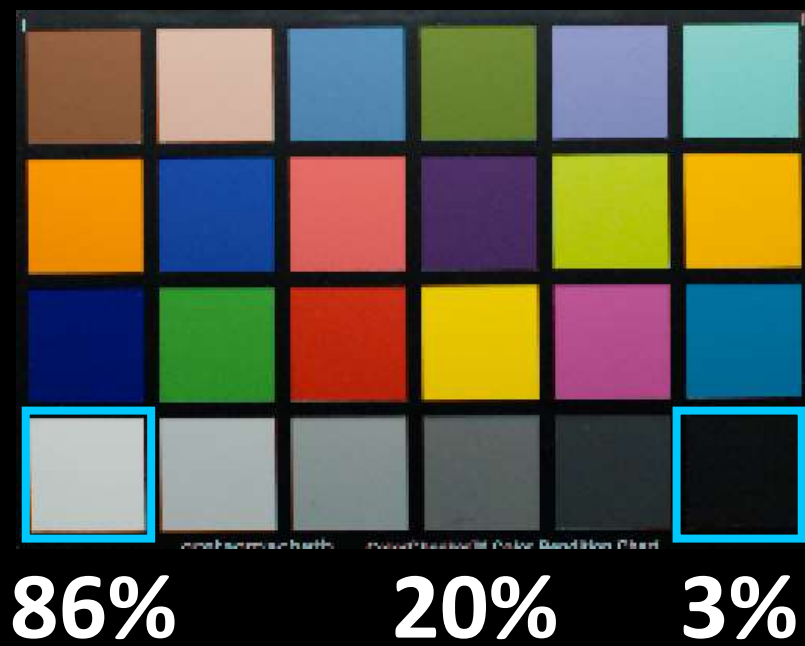
輝度 (cd/m²)



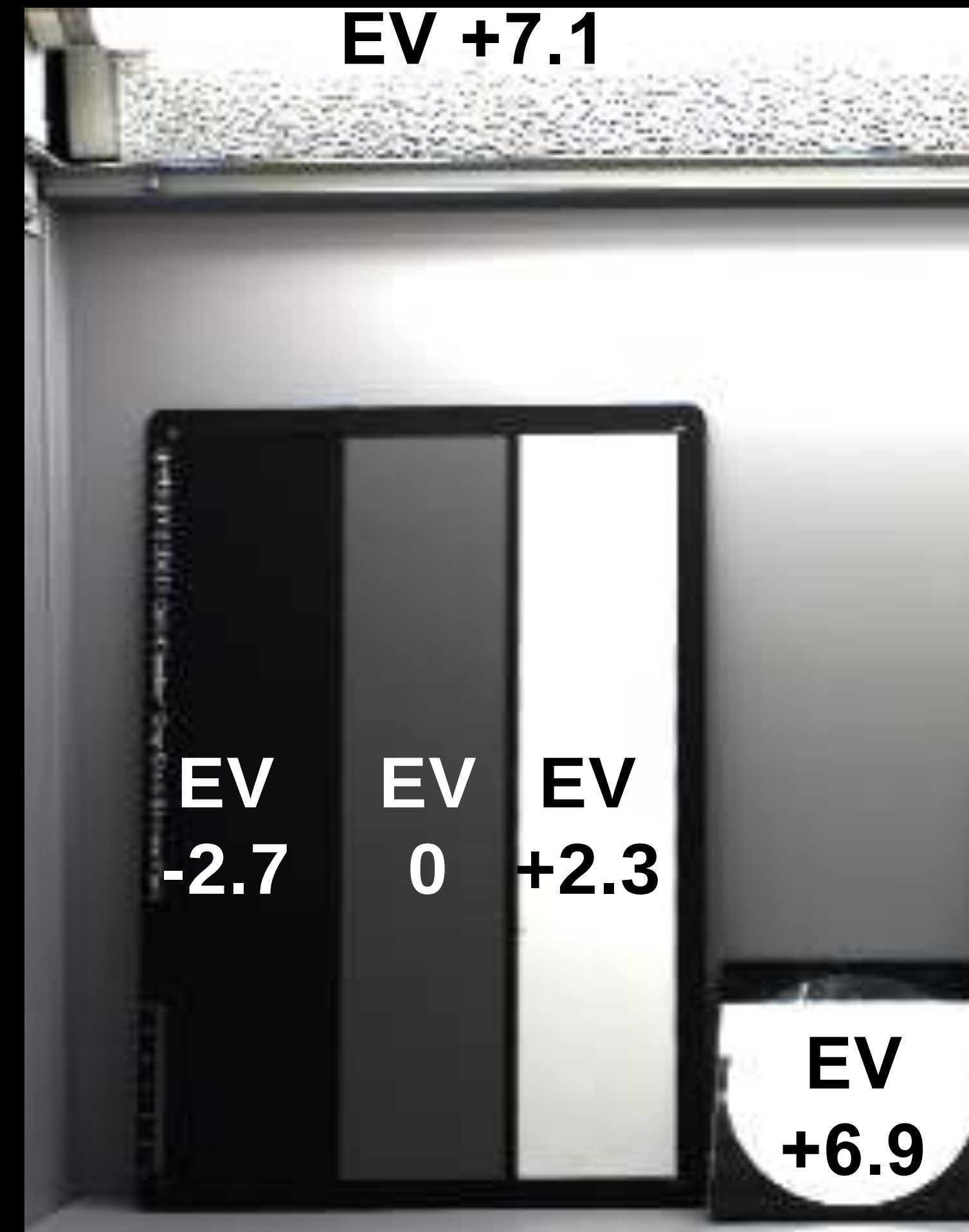
Spotmeter

Scene-referred Images

Color Checker



ACES Value
OpenEXR 16bit linear-half float
浮動小数点数



EV値 (Exposure Value)

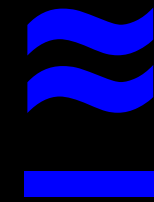


Spotmeter

Scene-linear/ACES

Scene-linearとはシーン輝度及び色度に相対的に近似する画像データ

Scene-linear



Scene Luminance

Scene-linear/ACES

Reflectance



High-dynamic Image

光量
0.18

光量
1.0

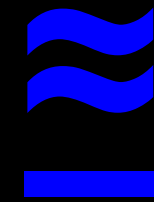
Diffuse: 0.18

32bit float (Scene Linear)

Scene-linear/ACES

Scene-linearとはシーン輝度及び色度に相対的に近似する画像データ

Scene-linear



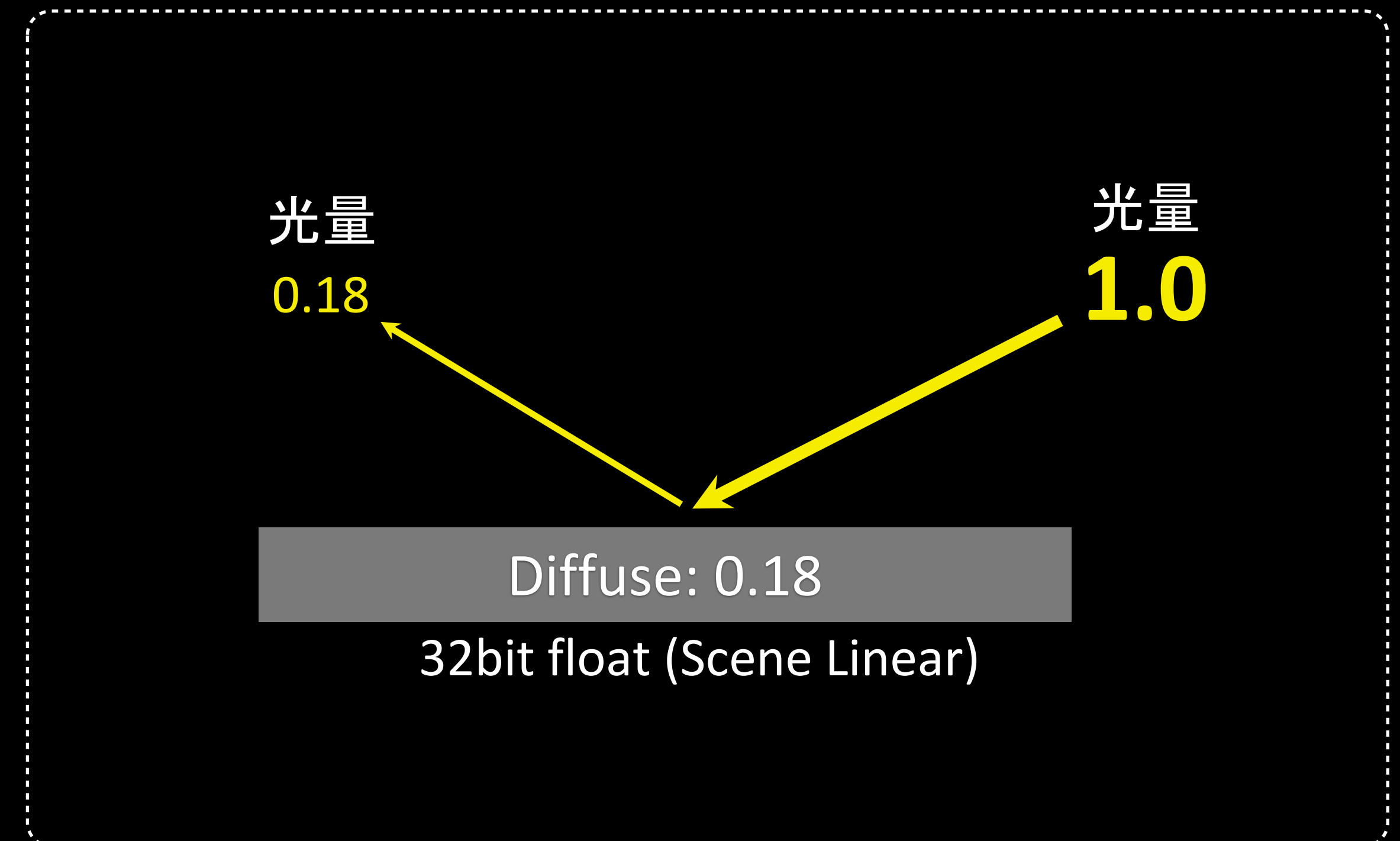
Scene Luminance

Stops(EV)
Scene-linear/ACES

Reflectance

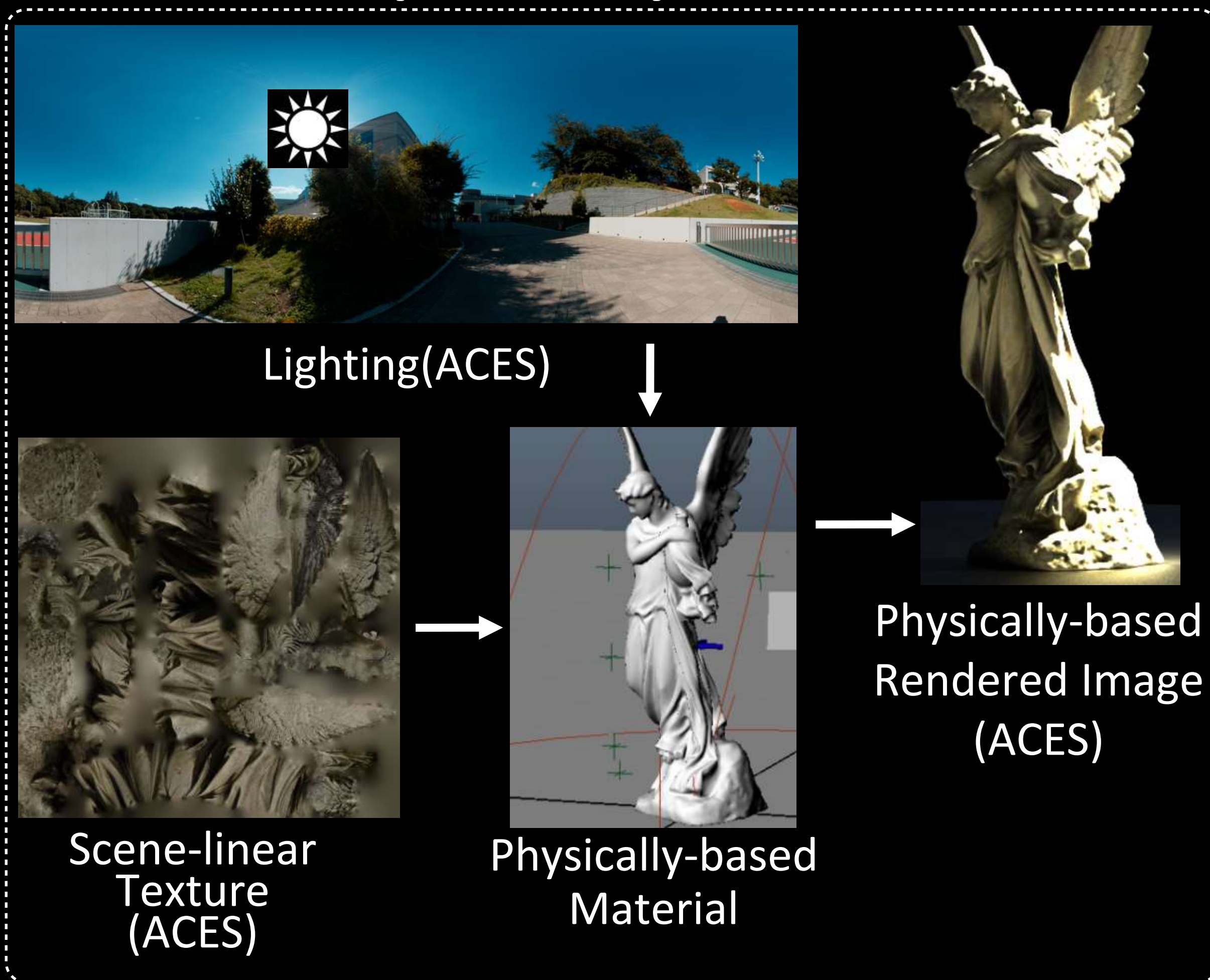


High-dynamic Image

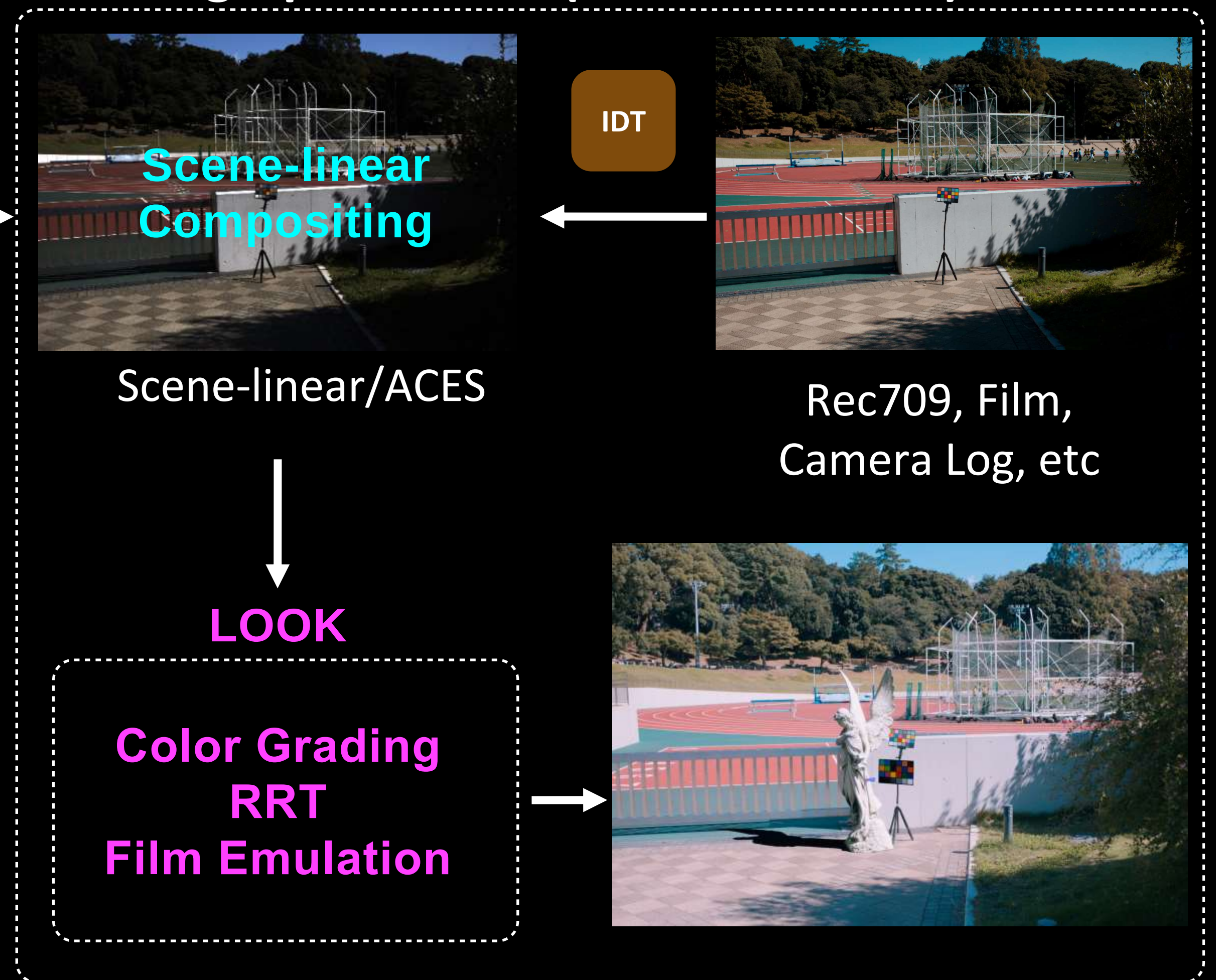


Scene-linear Workflow using ACES

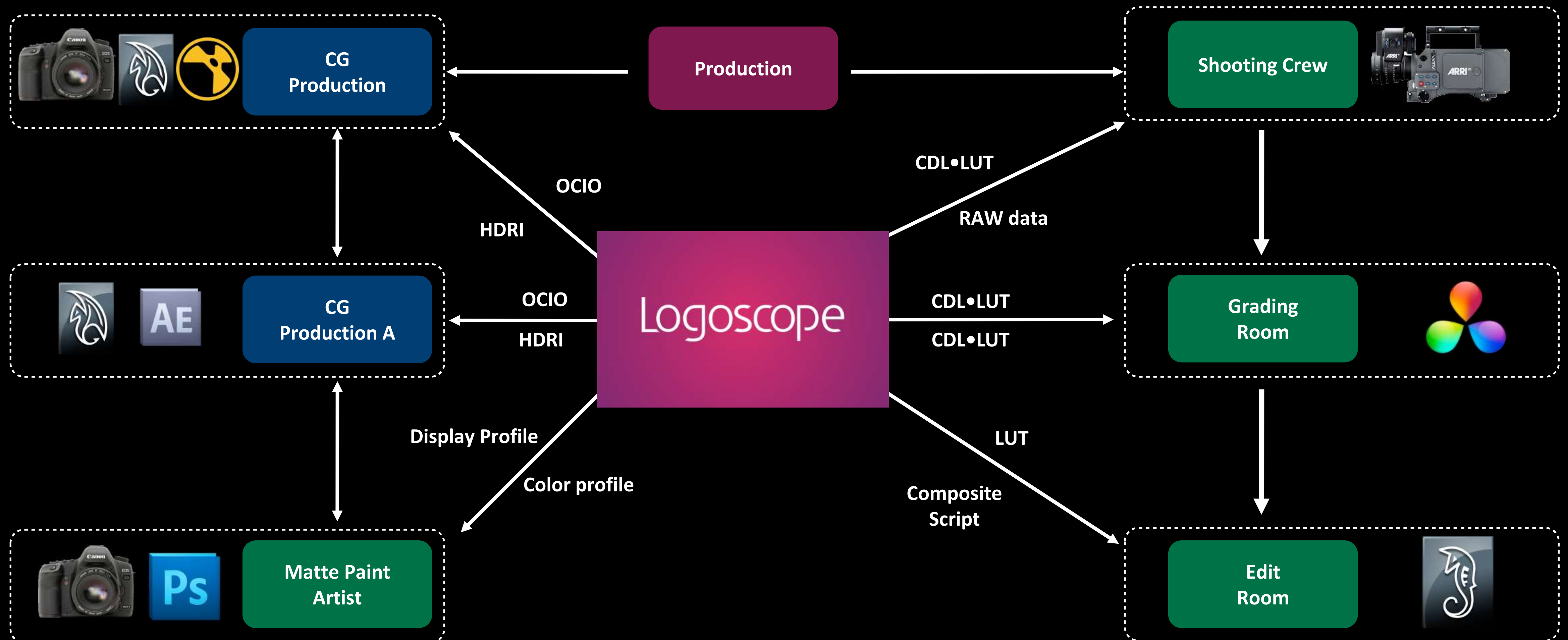
Computer Graphics



Photographic Plates (Film and Video)

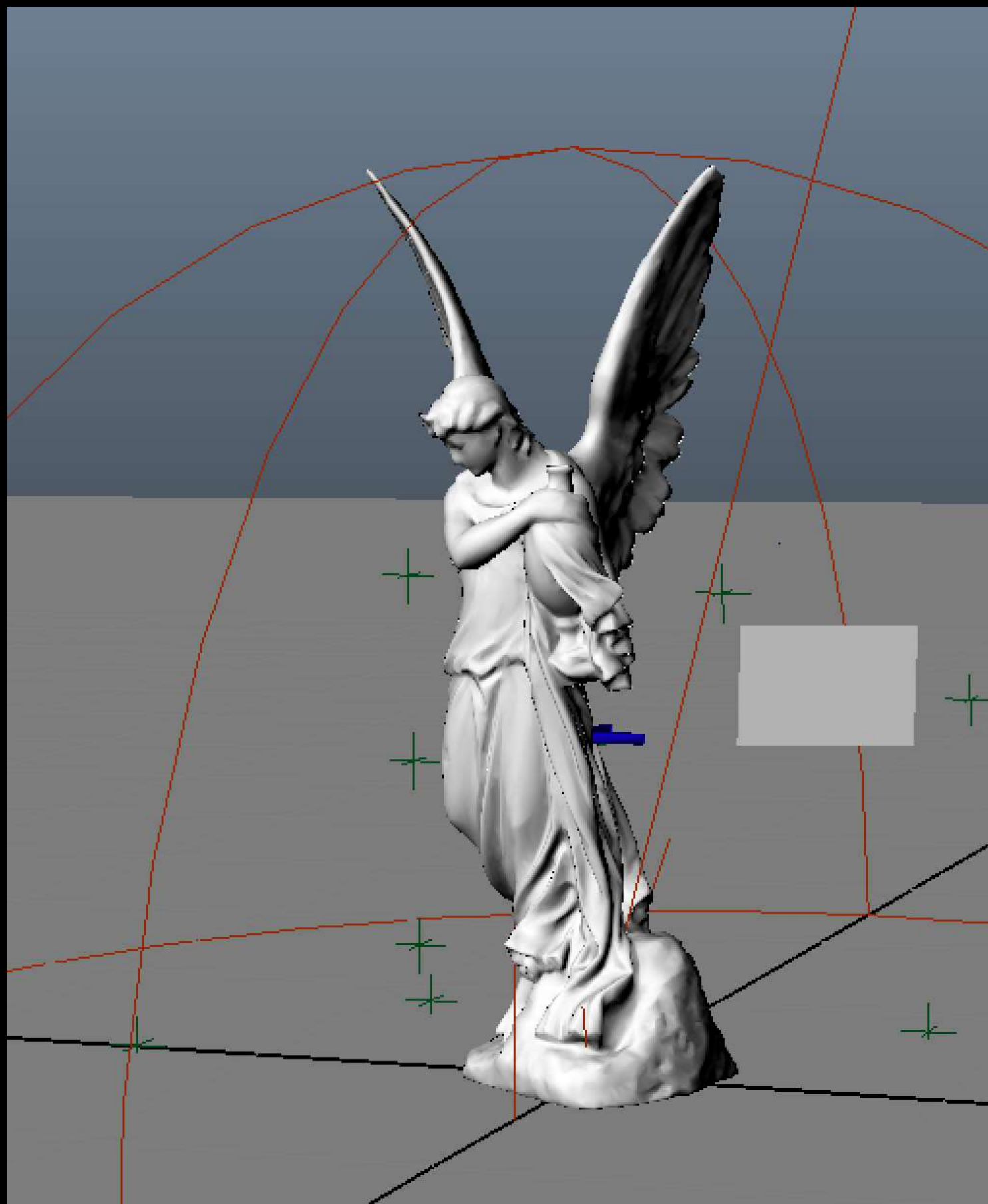


Logoscope Ltd.



Traditional Workflow without ACES

Computer Graphics



Look
Texture
Material

Photographic Plates



評価画像の撮影 (ACES)

撮影日時：2013年10月30日

カメラ：CANON C500

照明：ARRIタングステン

レコーダー：CODEX Onboard S Recorder

収録フォーマット：Cinema RAW

現像：Cinema RAW Development

画像フォーマット：OpenEXR

色空間：ACES (Scene-linear)

撮影協力：株式会社マックレイ

撮影：関 祥海（撮影、照明、DIT）

監修：亀村 文彦（株式会社ロゴスコープ）



評価画像の撮影



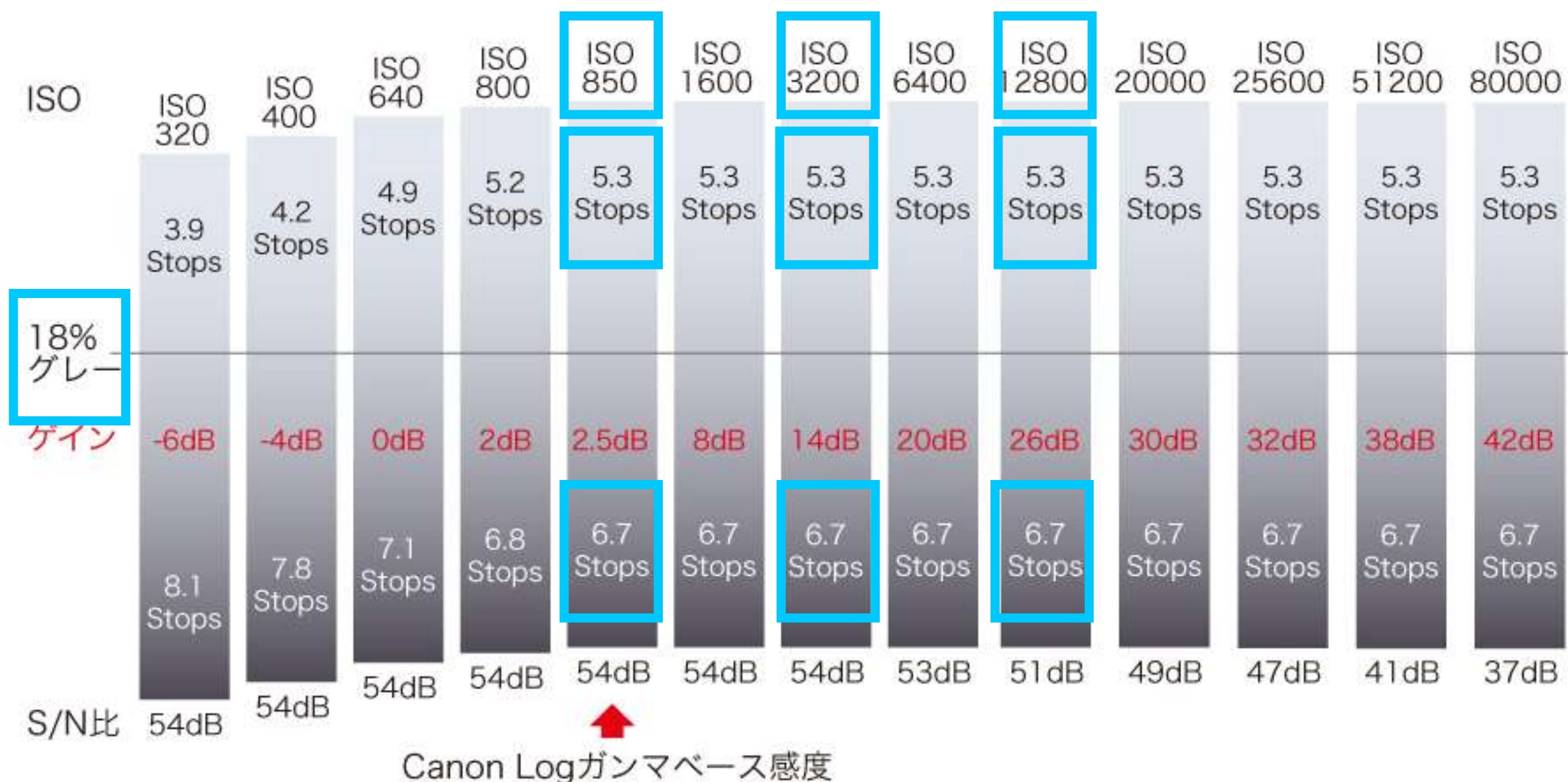
CANON C500が見るシーンの光（現実世界）



カメラレンズの位置から見る関氏

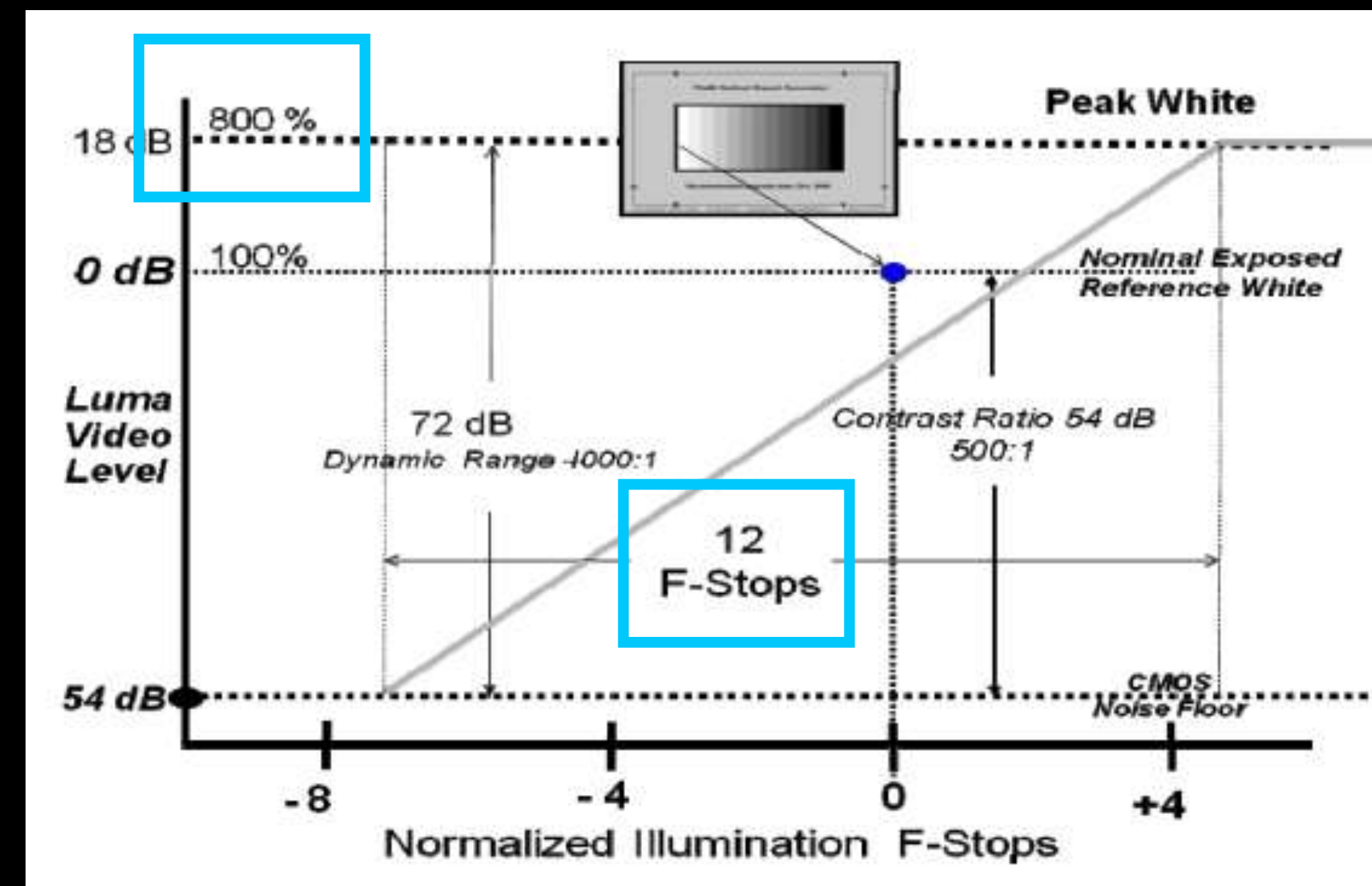
Dynamic-range (CANON CINEMA EOS)

感度とダイナミックレンジの関係



12ストップの再現域

<http://cweb.canon.jp/cinema-eos/lineup/digitalcamera/c500/feature-workflow.html>



新しいデジタルシネマ制作用35mmCMOSイメージセンサー

<http://cweb.canon.jp/manual/cinema-eos/whit-paper.html>



-3.0

+1.7

+5.3

+0.3

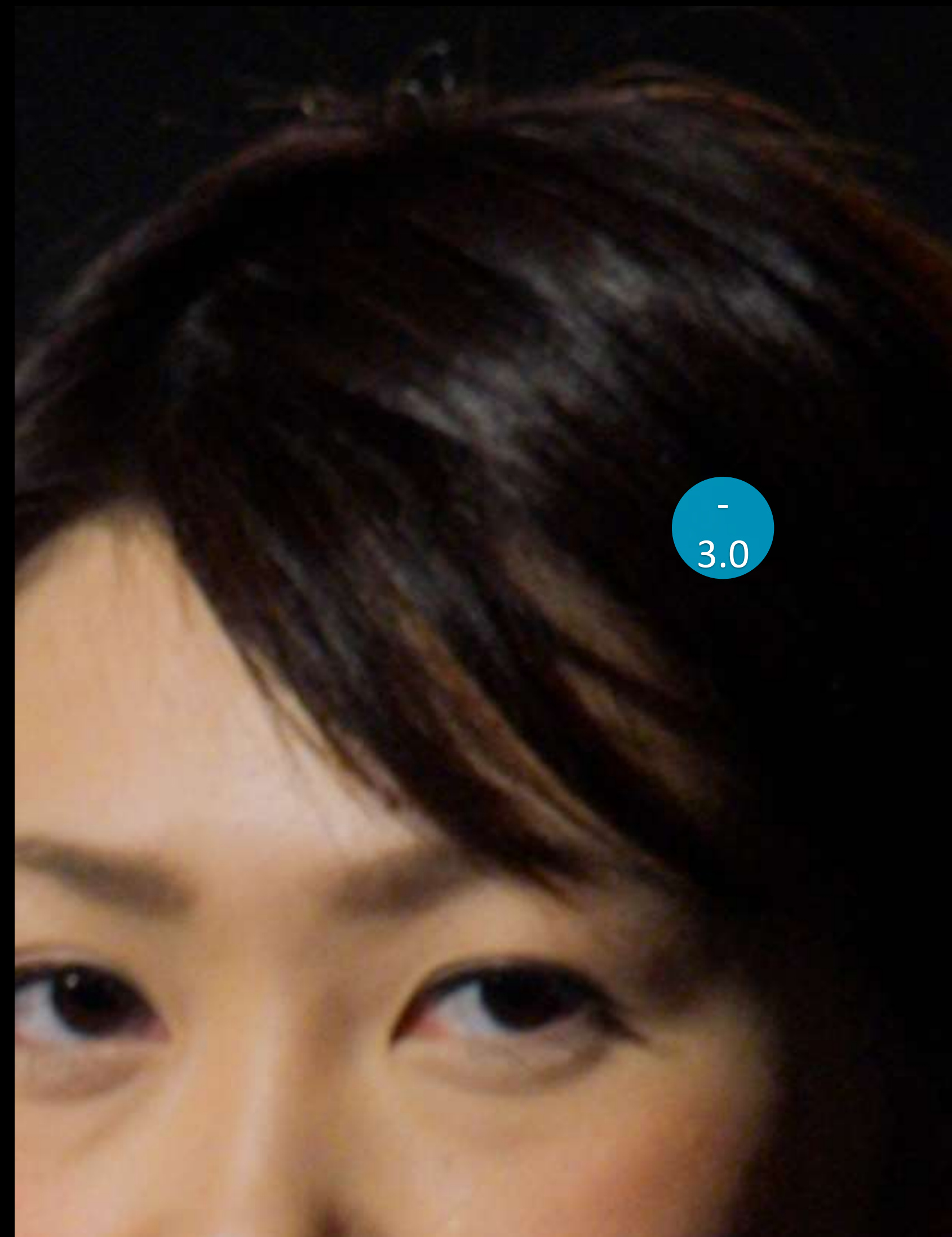
+2.0

0

-3.0

-5.0

Normal (ISO800)



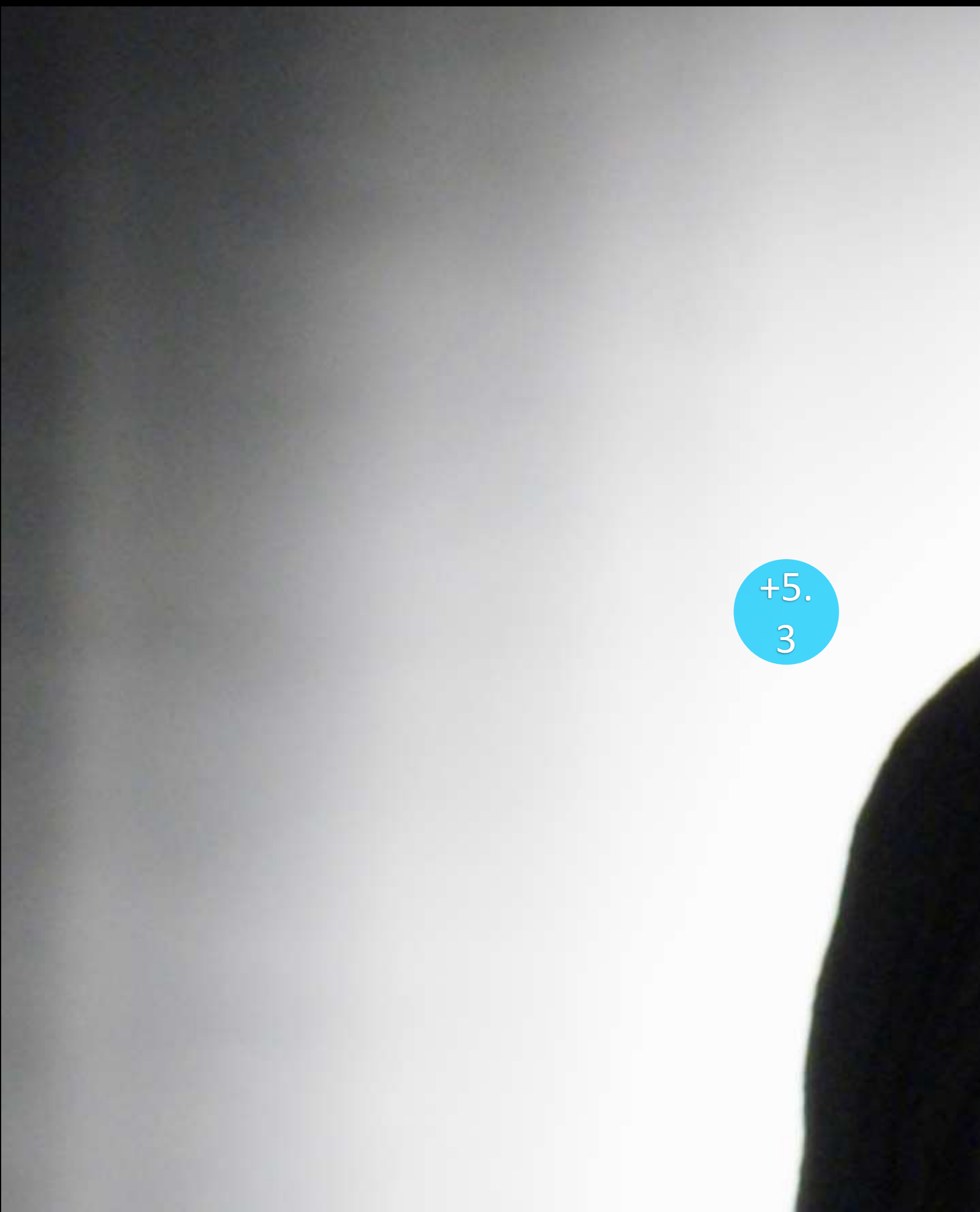
+1.5 Stops (ISO800)



+1.5 Stops (ISO3200)



Normal (ISO800)



-3.0 Stops (ISO800)



-3.0 Stops (ISO12800)



ISO800



ISO3200



ISO12800



Visual Sequential De-noise Effects

HFR(60fps)フッテージは、従来の24fpsに比べて、画像中のノイズが知覚できない。（kamemura2013）



120-24fps

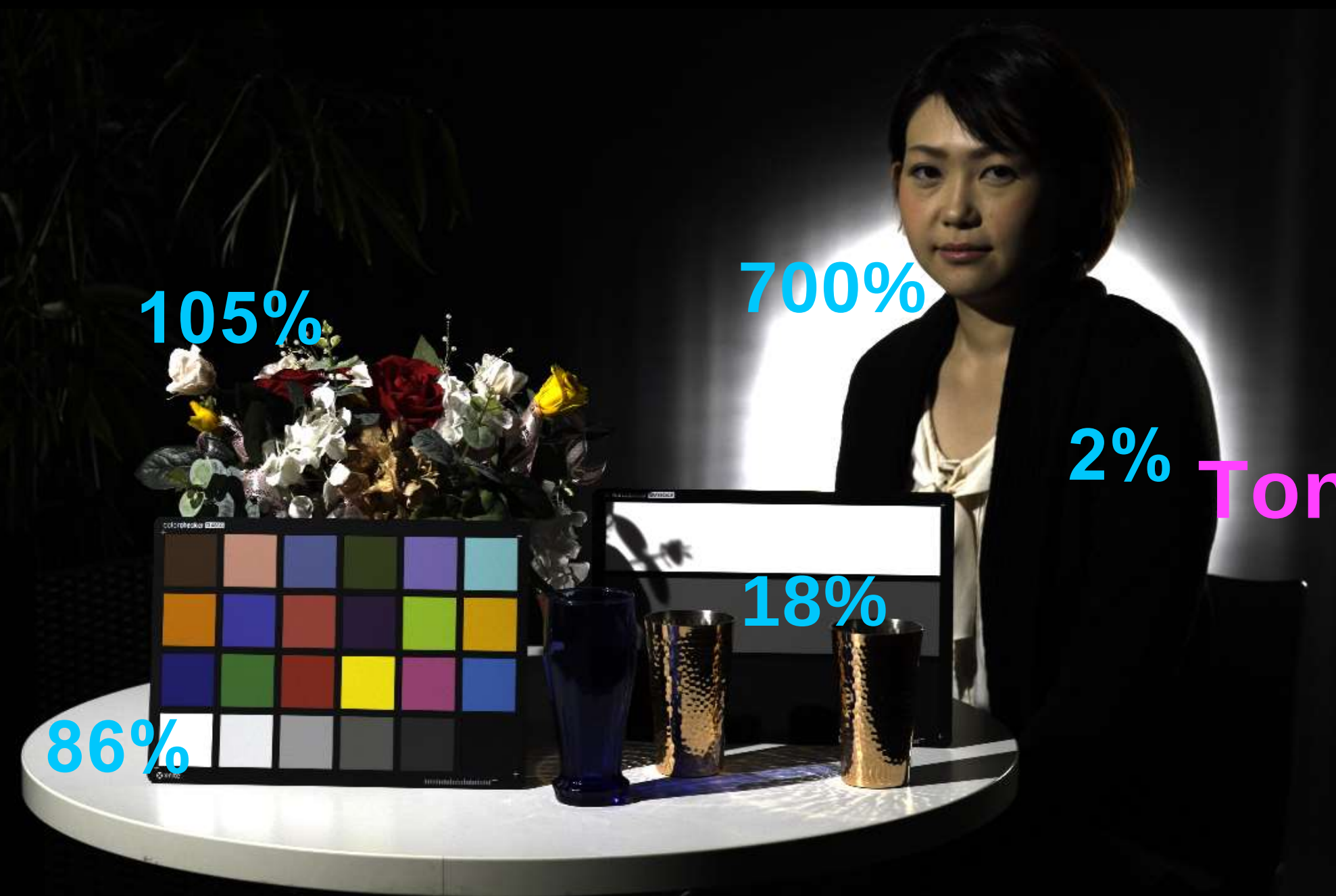


120->60fps

RRT: Reference Rendering Transform

Scene-linear: 0- ∞

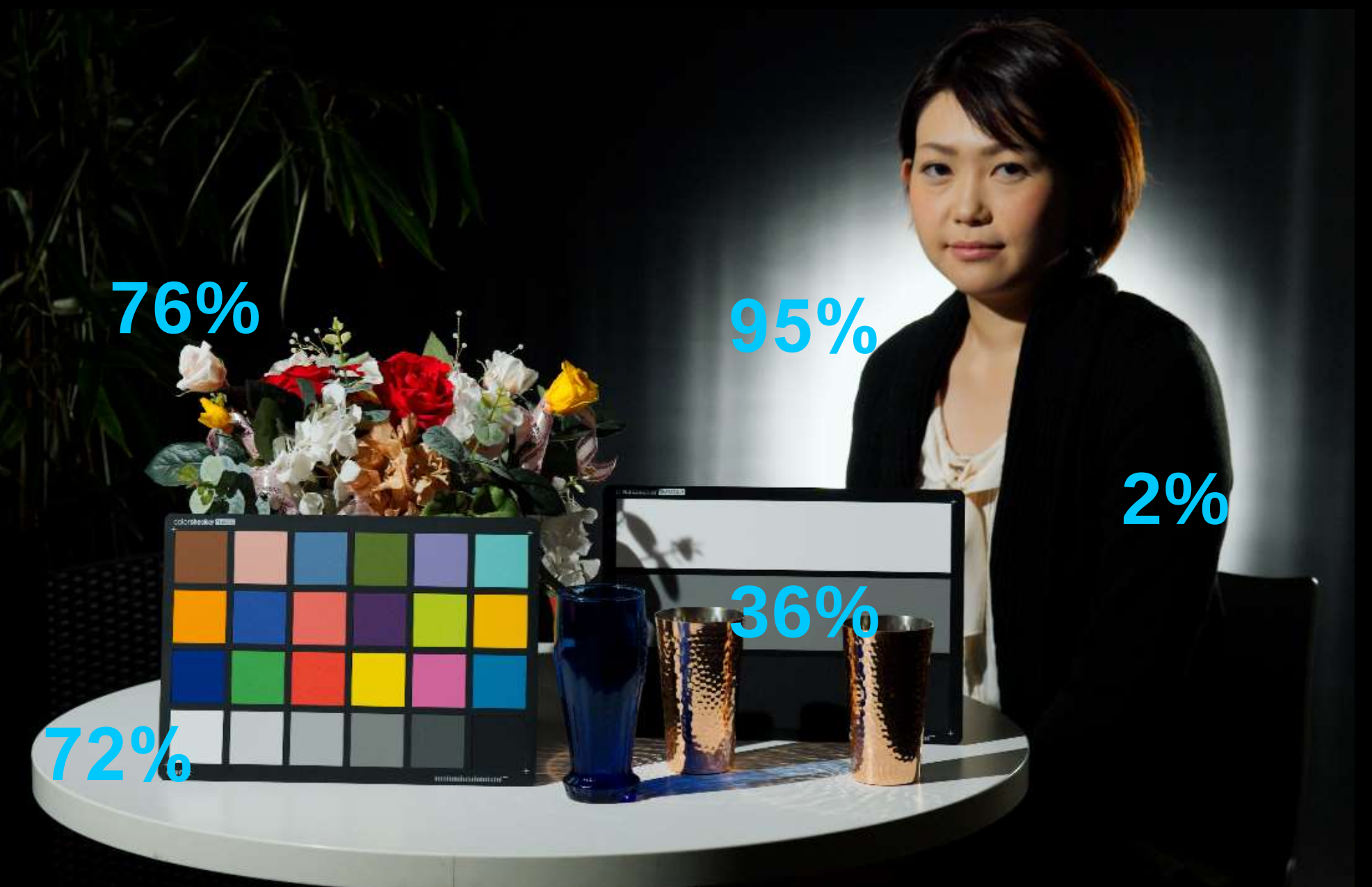
Display: 0-1.0



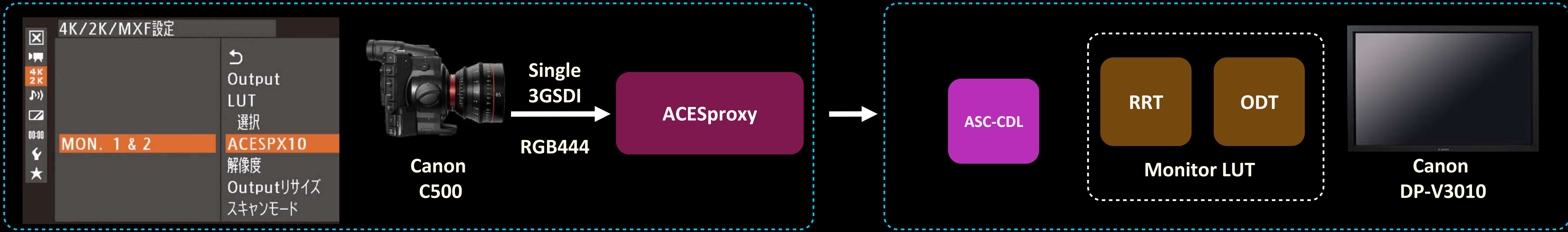
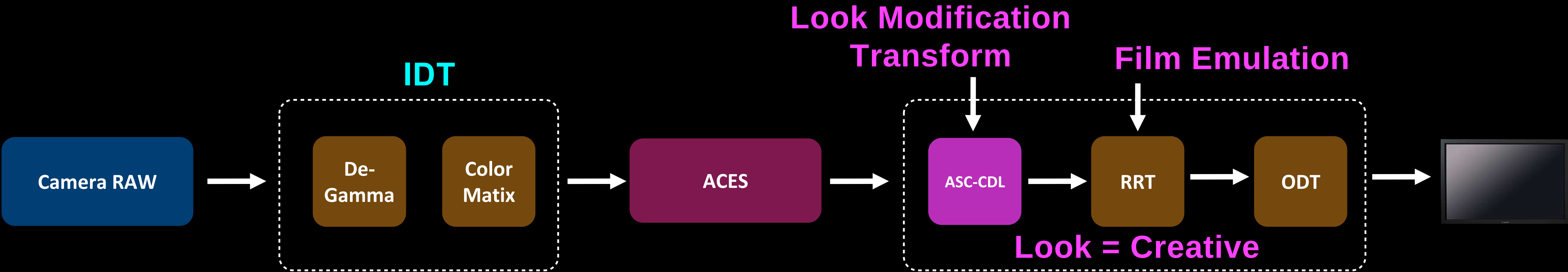
RRT



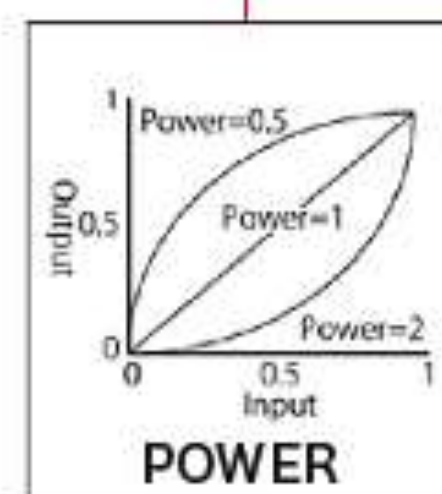
2% Tone Mapping Effects



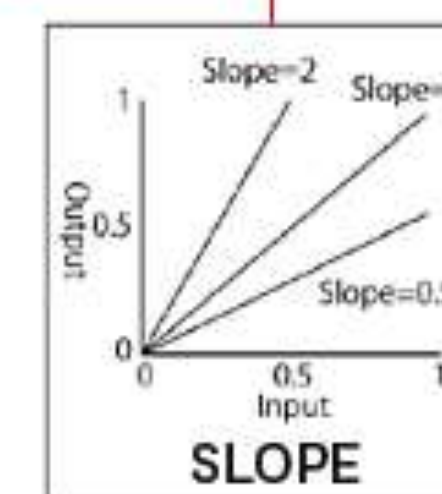
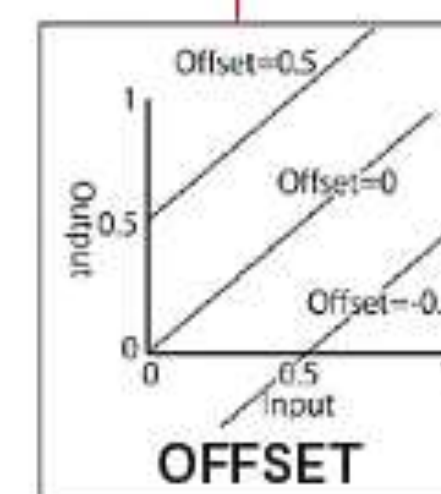
ACESproxy



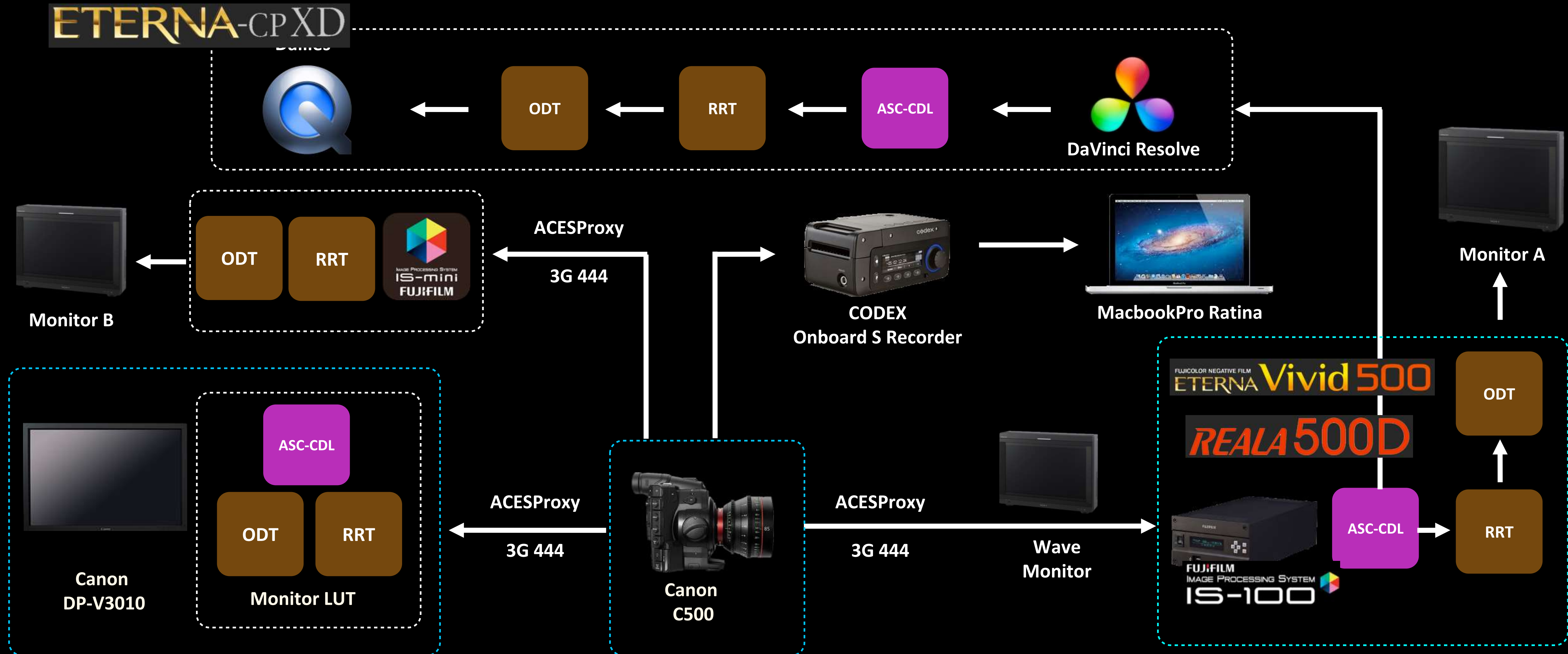
DP-V3010



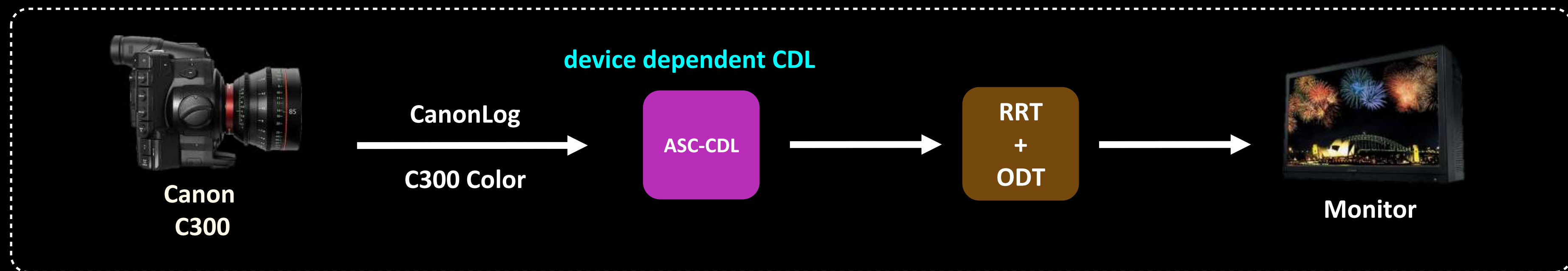
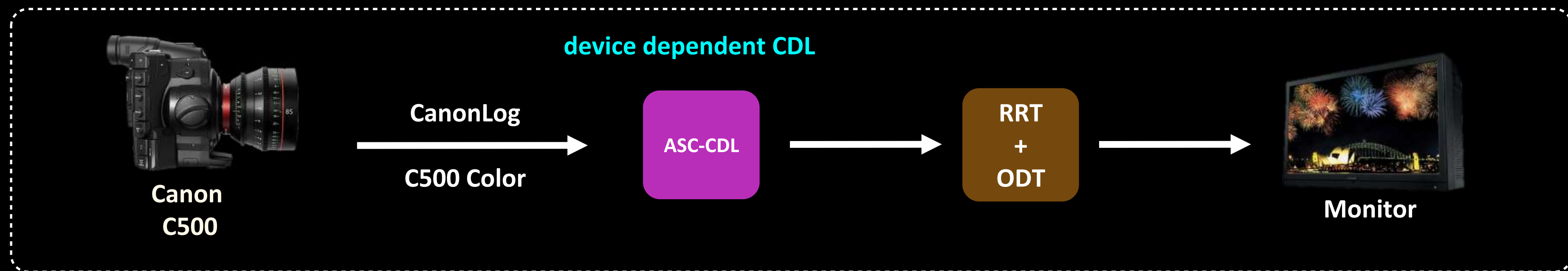
SATURATION



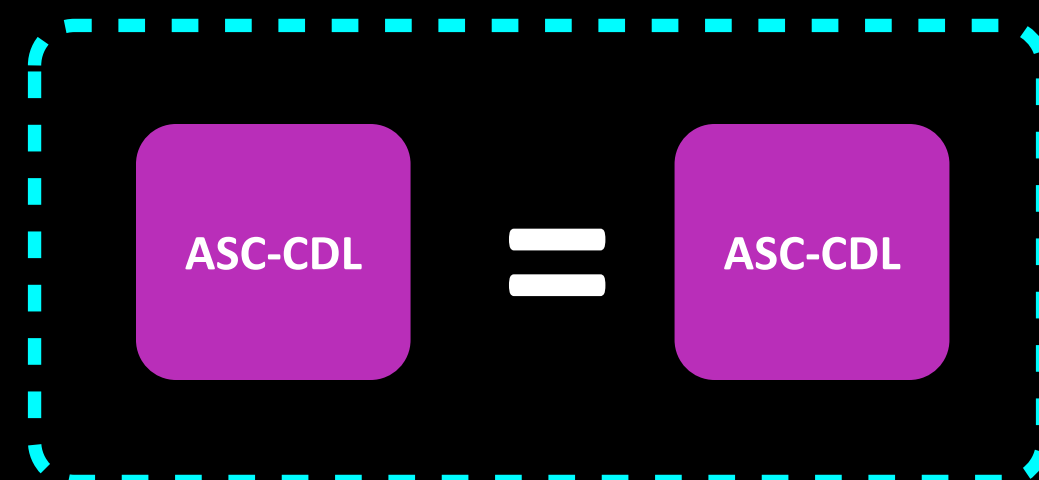
Shooting Diagram



Sharing Look Parameter(ASC-CDL)



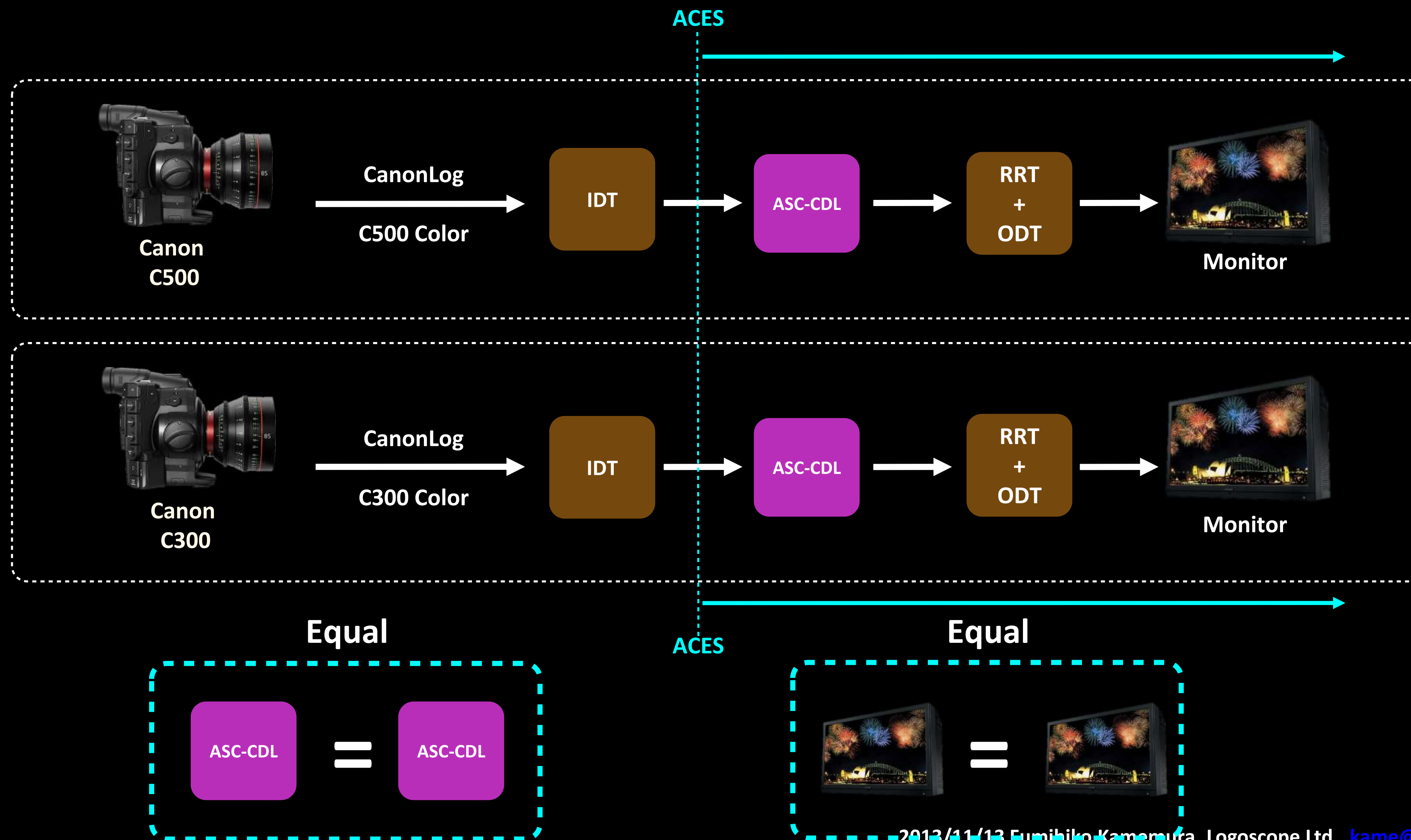
Equal



Not equal



Sharing Look Parameter(ASC-CDL)



Canon EF Lenses List

Canon EF Lens Specifications & Accessories Table

LENS	Apparent focal length (mm)		Angle of View (35mm)*			Lens Construction (Groups/Elements)	No. of Diaphragm Blades	Minimum Aperture (f)	Closest Focusing Distance		Maximum Magnification (x)	AF Actuator	Filter Diameter (mm)	Max Diameter x Length (in./mm)		Weight	Magnification w/Extension Tube (f/12 II)	Magnification w/Extension Tube (f/25 I)	Lens Hood	Hard Case	Soft Case	G. F. Holder III (Hood II)*1	G. F. Holder IV (Hood V)*2
	APS-H	APS-C	Horizontal	Vertical	Diagonal				(ft.)	(m)				(in.)	(mm)								
EF 50-22mm f/1.5 S.S. I USM	N/A	16-35	97°10' - 54°30'	74°10' - 37°50'	107°30' - 63°30'	10/13	6	22	0.8	0.24	0.17	Ring USM	77	3.3/83.5 x 3.5/89.8	13.6	385	0.77-0.38	1.51-1.28	EW-83E	-	LP3119	NC	(0)
EF 56 55mm f/2.8 L USM**	21-45	26-56	98° - 54°	74°10' - 38°	108°10' - 63°	10/14	7	22	0.9	0.28	0.22	Ring USM	77	3.3/83.5 x 4.3/103	1.3 lbs.	600	0.87-0.36	1.09-0.80	EW-83E	-	LP3119	NC	(0)
EF 17-40mm f/4 L USM**	22-52	27-64	84° - 34°	53° - 19°30'	74° - 29°	9/12	7	22	0.92	0.28	0.24 (at 40mm)	Ring USM**	77	3.3/83.5 x 3.8/96.8	1.1 lbs.	475	0.83-0.32	1.02-0.40	EW-83E	-	LP3119	NC	(0)
EF 20 35mm f/1.5 L USM**	26-46	32-56	84° - 54°	62° - 38°	94° - 69°	11/12	5	22-27	1.1	0.34	0.13 (at 35mm)	Ring USM**	77	3.3/83.5 x 2.7/69.8	11.9	340	0.70-0.36	1.00-0.80	EW-83II	-	LP3214	NC	(0)
EF 5 17-85mm f/4-5.6 IS USM	N/A	27-136	68°40' - 13°25'	48° - 10°25'	78°30' - 18°25'	12/17	6	22	1.1	0.35	0.20	Ring USM	67	3.1/78.5 x 3.6/92	1.1 lbs.	475	0.43-0.14	0.72-0.33	EW-73II	-	LP3116	NC	(0)
EF 18-55mm f/3.5-5.6 IS USM	N/A	29-88	65°30' - 23°20'	45°30' - 15°40'	74°20' - 27°50'	9/11	6	22-38	0.92	0.28	0.28 (at 55mm)	Ring USM II	58	2.7/69 x 2.6/66.2	6.7	190	0.81-0.23	0.92-0.51	EW-60C	-	LP814	(0)	(0)
EF 18-55mm f/3.5-5.6*	N/A	29-88	65°30' - 23°20'	45°30' - 15°40'	75°20' - 27°50'	9/11	6	22-38	0.92	0.28	0.28 (at 55mm)	MM	58	2.7/69 x 2.6/66.2	6.7	190	0.81-0.23	0.92-0.51	EW-60C	-	LP814	(0)	(0)
EF 24-70mm f/2.8 L USM**	31-91	38-112	84° - 34°	53° - 19°30'	74° - 29°	13/16	8	22	1.25	0.38	0.29 (at 70mm)	Ring USM**	77	3.3/83.2 x 4.9/123.3	2.1 lbs.	950	0.63-0.18	1.25-0.40	EW-83F	-	LP3219	(0)	(0)
EF 24-85mm f/3.5-4.5 L USM**	31-111	38-136	74° - 24°	53° - 16°	84° - 28°30'	12/15	6	22-32	1.6	0.5	0.16 (at 85mm)	Ring USM**	67	2.9/73 x 2.7/69.5	13.4	380	0.59-0.15	1.23-0.33	EW-73II	-	LP3014	NC	(0)
EF 28 80mm f/3.5-5.6 II	36-104	45-128	75° - 30°	46° - 17°	65° - 25°	10/10	5	23-38	1.25	0.38	0.26 (at 80mm)	MM*	58	2.6/67 x 2.8/71	7.8	200	0.57-0.16	1.14-0.35	EW-60C	-	LP814	(0)	(0)
EF 28-90mm f/4-5.6 II USM	36-112	45-144	65° - 22°40'	46° - 15°10'	75° - 27°	8/10	5	22-32	1.3	0.38	0.30 (at 90mm)	Micro USM*	58	2.6/67 x 2.8/71	6.7	190	0.56-0.14	1.13-0.31	EW-60C	-	LP814	(0)	(0)
EF 28-90mm f/4-5.6 III	36-112	45-144	65° - 22°40'	46° - 15°10'	75° - 27°	8/10	5	22-32	1.3	0.38	0.30 (at 90mm)	MM	58	2.6/67 x 2.8/71	6.7	190	0.56-0.14	1.13-0.31	EW-60C	-	LP814	(0)	(0)
EF 28-105mm f/3.5-5.5 I USM**	36-136	45-168	61° - 19°20'	46° - 13°	75° - 23°20'	12/15	7	22-27*	1.6	0.5	0.19 (at 105mm)	Ring USM**	58	2.8/72 x 3/75	13.5	375	0.53-0.12	0.75-0.27	EW-63II	-	LP814	(0)	(0)
EF 28-105mm f/4-5.6 USM**	36-136	45-168	63° - 19°20'	46° - 13°	75° - 23°20'	9/10	6	22-32	1.57	0.48	0.19 (at 105mm)	Micro USM*	58	2.6/67 x 2.7/68	7.4	210	0.54-0.12	1.11-0.27	EW-63II	-	LP814	(0)	(0)
EF 28-135mm f/3.5-5.6 IS USM**	36-176	42-226	65° - 15°	46° - 10°	75° - 18°	12/16	6	22-36	1.64	0.5	0.19 (at 135mm)	Ring USM**	72	3.1/78.4 x 3.8/96.8	1.2 lbs.	540	0.53-0.09	1.09-0.21	EW-788II	-	LP3116	(0)	(0)
EF 28-200mm f/3.5-5.6 L USM**	36-260	45-320	55° - 6°	46° - 7°	75° - 12°	12/16	6	22-36	1.5	0.45	0.28 (at 200mm)	Micro USM**	72	3.1/78.4 x 3.5/96.8	1.1 lbs.	500	0.54-0.06	1.10-0.14	EW-78D	-	LP3116	NC	(0)
EF 35-80mm f/4-5.6 III	44-104	56-128	54° - 25°	38° - 17°	63° - 30°	8/8	5	22-32	1.3	0.4	0.23 (at 80mm)	MM*	52	2.6/65 x 2.5/63.5	6.2	175	0.50-0.16	0.97-0.35	EW-54II	-	LP814	(1)	(1)
EF 35-100mm f/3.5-5.6 L IS USM	36-190	45-480	65° - 6°30'	45° - 4°35'	73° - 8°15'	16/22	8	38	2.3	0.7	0.30 (at 100mm)	Ring USM**	77	3.6/92 x 7.2/184	3.7 lbs.	1,670	0.50-0.04	0.50-0.09	EW-83E	-	LZ3324	NC	(6)
EF 55-200mm f/4-5.5-6 II USM	72-260	88-320	56° - 10°	25° - 7°	43° - 12°	13/13	6	22-29	3.9	1.2	0.17	Micro USM	52	3.4/86.2 x 7.8/197	10.9	310	0.22-0.06	0.41-0.14	EF-54	-	LP1016	(0)	(1)
EF 70-200mm f/2.8 L IS USM**	91-260	112-320	29° - 10°	15°30' - 7°	34° - 12°	18/23	8	32	4.6	1.4	0.16 (at 200mm)	Ring USM**	77	7.3/84.6 x 7.6/193.8	3.2 lbs.	1,470	0.22-0.06	0.41-0.14	EF-86	-	LZ3324	(2)	(2)
EF 70-200mm f/2.8 L USM**	91-260	112-320	29° - 10°	15°30' - 7°	34° - 12°	15/18	8	32	4.9	1.5	0.21 (at 200mm)	Ring USM**	77	3/16 x 6.8/172	2.9 lbs.	1,310	0.23-0.06	0.39-0.13	EF-83II	-	LZ3324	(2)	(3)
EF 70-200mm f/4 L USM**	91-260	112-320	29° - 10°	15°30' - 7°	34° - 12°	12/16	8	32	3.9	1.2	0.26 (at 200mm)	Ring USM**	67	3.1/78.5 x 5.4/137.2	1.6 lbs.	705	0.21-0.04	0.39-0.09	EF-74	-	LP3224	(5)	(4)
EF 70-300mm f/4-5.5-6 DO IS USM**	91-390	112-480	29° - 6°50'	19°30' - 4°35'	34° - 8°15'	12/18	6	32-38	4.6	1.4	0.19 (at 300mm)	Ring USM**	58	3.2/82.4 x 3.9/99.9	1.6 lbs.	720	0.26-0.04	0.46-0.09	EF-65II	-	LP3116	(4)	(4)
EF 75-300mm f/4-5.6 IS USM	98-390	120-480	27° - 6°50'	18°11' - 4°35'	32°11' - 8°15'	10/15	8	32-45	4.9	1.5	0.26 (at 300mm)	Micro USM	58	3.3/78.5 x 5.4/137.2	1.4 lbs.	650	0.21-0.04	0.39-0.09	EF-64II	-	LP3022	(5)	(4)
EF 75-300mm f/4-5.6 II USM	98-390	120-480	27° - 6°50'	18°11' - 4°35'	32°11' - 8°15'	9/13	7	32-45	4.9	1.5	0.25 (at 300mm)	Micro USM	58	2.8/71 x 4.8/122	1.1 lbs.	480	0.21-0.04	0.39-0.09	EF-60	-	LP3019	(5)	(4)
EF 75-300mm f/4-5.6 II	98-390	120-480	27° - 6°50'	18°11' - 4°35'	32°11' - 8°15'	9/13	7	32-45	4.9	1.5	0.25 (at 300mm)	MM*	58	2.8/71 x 4.8/122	1.1 lbs.	480	0.21-0.04	0.39-0.09	EF-60	-	LP3019	(5)	(4)
EF 100-300mm f/4.5-5.6 L USM**	130-390	160-480	20° - 6°50'	14° - 4°35'	24° - 8°15'	10/13	8	32-38*	4.9	1.5	0.20 (at 300mm)	Ring USM**	58	2.9/73 x 4.8/121.5	1.2 lbs.	540	0.26-0.04	0.57-0.09	EF-65II	-	LP3019	(5)	(4)
EF 100-400mm f/4.5-5.6 L IS USM**	130-520	160-640	20° - 5°10'	14° - 3°20'	24° - 6°10'	14/17	8	32-38*	5.9	1.8	0.20 (at 400mm)	Ring USM**	77	3.6/92 x 7.6/189	3.0 lbs.	1,380	0.19-0.03	0.35-0.07	EF-83C	-	LZ3324	(4)	(5)
EF 14mm f/2.8 L USM**	18	22	104°	81°	114°	10/14	5	22	0.8	0.25	0.10	Ring USM*	Gelatin	3/77 x 3.3/89	1.2 lbs.	560	-	-	Built-In	-	LP3016	NC	NC
EF 15mm f/2.8 Fisheye	20	24	147°54'	91°44'	180°	7/8	5	23	0.7	0.2	0.14	AFD	Gelatin	2.9/73 x 2.6/62.2	11.8	330	0.94-0.80	-	Built-In	-	LP814	NC	NC
EF 20mm f/2.8 L USM**	26	32	84°	62°	94°	9/11	5	22	0.8	0.25	0.14	Ring USM**	72	3.1/77.5 x 2.8/70.6	14.3	405	0.72-0.60	-	EW-75II	-	LP3214	NC	NC
EF 24mm f/1.4 L USM**	31	38	74°	53°	84°	9/11	7	22	0.82	0.25	0.16	Ring USM**	77	3.3/83.5 x 3.0/74	1.2 lbs.	550	0.66-0.50	-	EW-83DII	-	LP3214	NC	NC
EF 24mm f/2.8	31	38	74°	53°	84°	10/10	6	22	0.8	0.25	0.16	AFD	58	2.7/67 x 3.1/84.5	9.5	270	0.64-0.50	1.22-1.15	EW-60II	-	LP811	(0)	(0)
EF 28mm f/1.8 L USM**	36	45	65°	46°	75°	9/10	7	22	0.8	0.25	0.18	Ring USM**	58	2.9/73.6 x 2.2/55.6	16.9	310	0.61-0.43	1.13-0.96	EW-63II	-	LP814	(0)	(0)
EF 28mm f/2.8	36	45	65°	46°	75°	5/5	5	22	1.0	0.3	0.13	AFD	52	2.7/67 x 1.7/42.5	6.5	185	0.56-0.43	1.09-0.95	EW-65II	-	LP3011	(1)	(1)
EF 35mm f/1.4 L USM**	45	56	54°	38°	63°	9/11	8	22	0.98	0.3	0.18	Ring USM**	72	3.1/79.4 x 3.1/81	1.3 lbs.	580	0.54-0.36	0.97-0.78	EW-78C	-	LP3214	NC	(0)
EF 35mm f/2	45	56	54°	38°	63°	5/7	5	22	0.8	0.25	0.23	AFD	52	2.7/67 x 1.7/42.5	7.4	210	0.58-0.35	1.00-0.77	EW-65II	-	LP3013	(2)	(2)
EF 50mm f/1.4 USM	63	80	40°	27°	46°	6/7	8	22	1.5	0.45	0.15	Micro USM*	58	2.9/73.8 x 2/50.5	10.2	290	0.39-0.24	0.68-0.33	ES-71II	-	LP3014	(2)	(2)
EF 50mm f/1.8 II	63	80	40°	27°	46°	5/6	5	22	1.5	0.45	0.15	MM*	52	2.7/68.2 x 1.6/41	4.6	130	0.39-0.24	0.68-0.33	ES-62II	-	LP3014	(2)	(1)
EF 55mm f/1.2 L USM	111	136	24°	16°	28°30'	7/8	8	36	3.1	0.95	0.11	Ring USM	72	3.6/92 x 5.3/104	2.3 lbs.	1,025	0.25-0.15	0.42-0.33	ES-79II	-	LP3219	(5)	(5)
EF																							