**Photometrically Calibrated HDR Panorama Dataset for Data-driven Photometric Computer Vision.**

2300 HDR 360° panoramas with absolute luminance and color values!

New photometric vision tasks!

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**Beyond the Pixel:**

*a Photometrically Calibrated HDR Dataset for Luminance and Color Prediction*

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**MOTIVATION:** We live in a light field, that impacts our biology and the way we interact with our environment. However, most computer vision tasks treat pixels without considering the physical light. To measure absolute light quantities, expensive specialized hardware is required. Can we develop methods that consider the physical light that lies beyond the pixel?

**CONTRIBUTIONS:** We present the Laval Photometric HDR Dataset, the first large scale photometric dataset. We also present three novel deep learning tasks aiming to explore the effect of various inputs on the predictions.

**METHOD**
I. Laval HDR Dataset: We calibrate this dataset, which contains over 2300 indoor HDR panoramas up to scale.
II. Setup: The Canon 5D captures a HDR bracket and the CL-200a measures the absolute illuminance.
III. HDR Illuminance: The HDR image is integrated to compute the scene illuminance. This value can be compared to the chroma meter measurement.
IV. Comparison HDR—Chroma meter: Repeating this process for over 120 scenes, a linear relation arises between the HDR and true illuminance. The slope of the regression for each channel is applied to the original dataset to obtain photometric HDR values.

**Architecture and data:**
- We present three novel learning tasks that are enabled by our dataset, and analyze different degradations (e.g., noise, quantization, tone mapping) on the input affect the prediction.
- We present the Laval Photometric HDR Dataset helps the conditions necessary for accurate light prediction.
- We wish to recover the luminance values from the HDR hemisphere reexposed and tonemapped (similar to [46].

**Per-pixel color:**
- We use the proposed Laval Photometric Indoor HDR Dataset to reexpose HDR photographs captured "in the wild." It is our hope that the different degradations (e.g., noise, quantization, tone mapping) on the input affect the prediction.

**Per-pixel luminance:**
- We present three novel learning tasks that are enabled by our dataset, and analyze different degradations (e.g., noise, quantization, tone mapping) on the input affect the prediction.
- The percentiles and corresponding measured scene CCT are indicated above the images. Images are physically accurate lighting predictions from real-world scenes.