



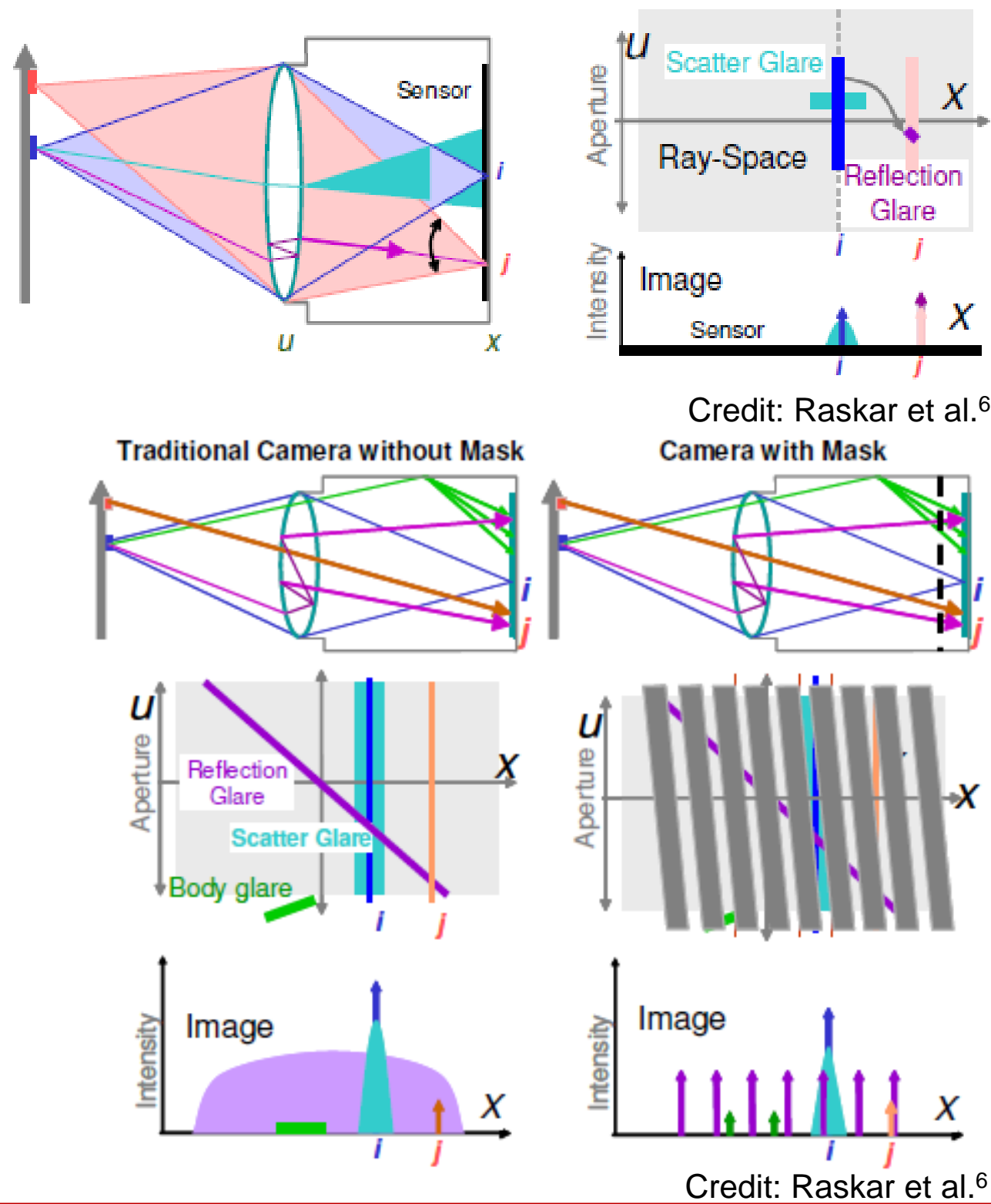
Reducing Glare Effects with 4D Ray Sampling

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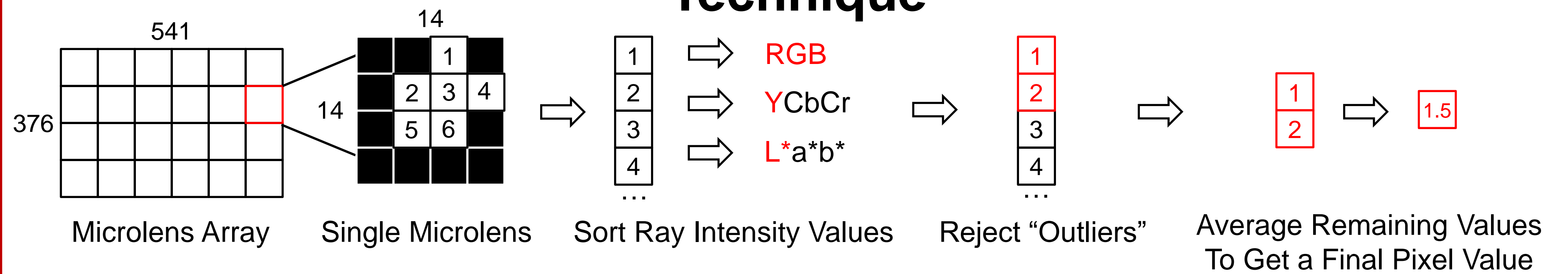
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Motivation

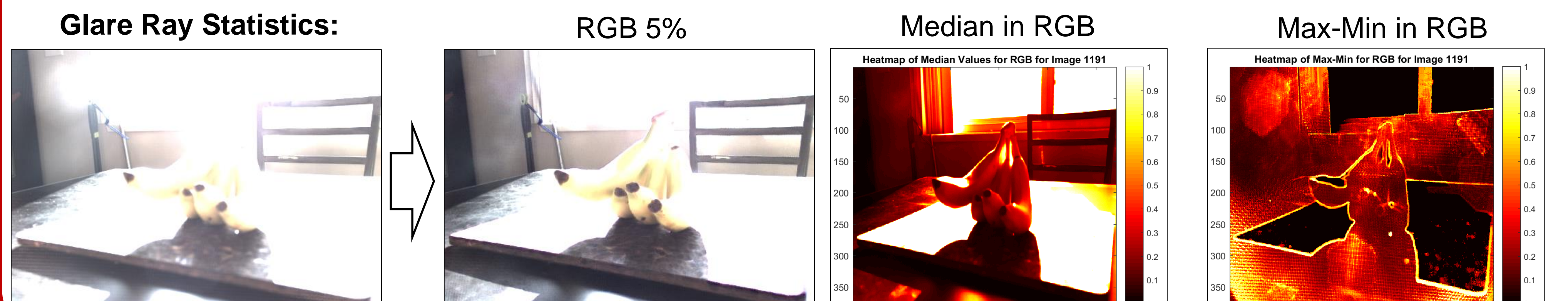
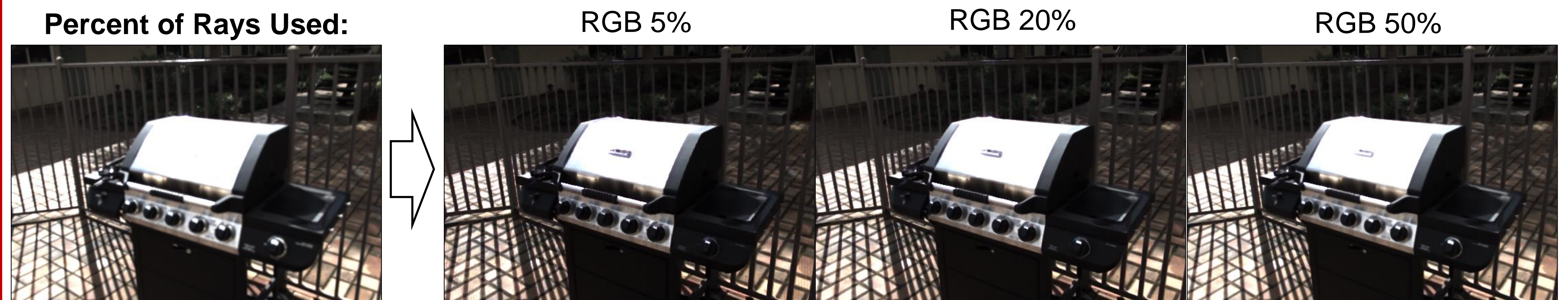
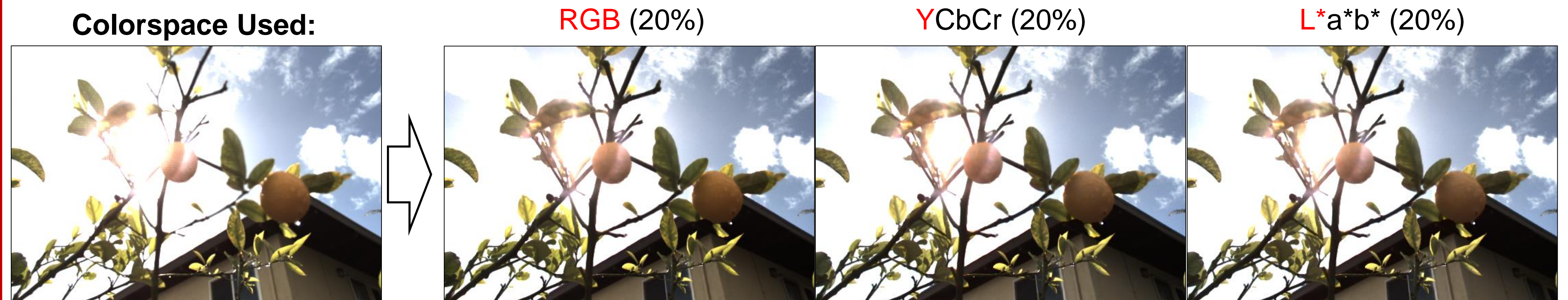
- *Image glare* is caused by the scattering and reflection of light within and between lenses.
- Glare is typically an *unwanted phenomenon* that reduces image contrast and can obscure detail.
- Raskar et al⁶ describe *statistical methods* for reducing glare by treating it as a 4D problem and performing *outlier rejection in ray space*.
- The **project goal** is to replicate the results of the Raskar et al⁶ paper using a lightfield camera (Lytro Illum) while exploring the statistical trade space.



Technique



Experimental Results



Related Work



Credit: Raskar et al. 6

1. Bitlis, B., Jansson, P., Allebach, J., "Parametric point spread function modeling and reduction of stray light effects in digital still cameras". Proc. SPIE 6498, Computational Imaging V, (February 28, 2007).
2. Levoy, M., and Hanrahan, P. 1996. "Light field rendering". In SIGGRAPH 96, 31–42.
3. Marwah, K., Wetzstein, G., Bando, Y., Raskar, R. "Compressive Light Field Photography using Overcomplete Dictionaries and Optimized Projections", ACM SIGGRAPH 2013.
4. Nayar, S. K., Krishnan, G., Grossberg, M. D., and Raskar, R. 2006. "Fast separation of direct and global components of a scene using high frequency illumination". ACM Trans. Graph. 25, 3 (July), 935–944.
5. Ng, R., Levoy, M., Brdif, M., Duval, G., Horowitz, M., and Hanrahan, N, P. 2005. Light field photography with a hand-held plenoptic camera. Tech. rep., Stanford Univ.
6. Raskar, R.; Agrawal, A.; Wilson, C.; Veeraraghavan, A, "Glare Aware Photography". ACM SIGGRAPH 2008.
7. Talvala, E.-V., Adams, A., Horowitz, M., and Levoy, M. 2007. Veiling glare in high dynamic range imaging. ACM Trans. Graph. 26,3 (July), 37:1–37:9.
8. Vaish, V., Levoy, M., Szeliski, R., Zitnick, L., and Kang, S. 2006. "Reconstructing occluded surfaces using synthetic apertures: Stereo, focus and robust measures". In Proc. Conf. Computer Vision and Pattern Recognition, vol. 2, 2331–2338.
9. Wetzstein, G., Ihrke, I., Heidrich, W. "On Plenoptic Multiplexing and Reconstruction", IJCV 2013