Portal-Masked Environment Map Sampling
(supplementary document)

Benedikt Bitterli[1,2]   Jan Novák[2]   Wojciech Jarosz[2]

[1]Walt Disney Animation Studios   [2]Disney Research Zürich

1. Introduction

This supplementary document contains additional results that did not fit in the paper. We refer the reader to the supplementary archive for full-resolution images of all comparisons shown here and in the paper.

2. Additional results

Figure 1 shows an exhaustive comparison of all 3×3 scene–environment map combinations, rendered using i.i.d. samples. Table 1 reports additional performance characteristics for all tested scene–environment map combinations. Figure 2 and Table 2 show the same comparison, rendered using an implementation of the Sobol low-discrepancy sequence [JK08]. The first 64 elements of the sequence were skipped to avoid strobing artifacts. Note that TTUV numbers are omitted in Table 2, since these cannot be computed accurately when a low-discrepancy sequence is used.

References

[JK08] JOE S., KUO F. Y.: Constructing sobol sequences with better two-dimensional projections. *SIAM Journal on Scientific Computing 30*, 5 (2008), 2635–2654. doi:10.1137/070709359. 1
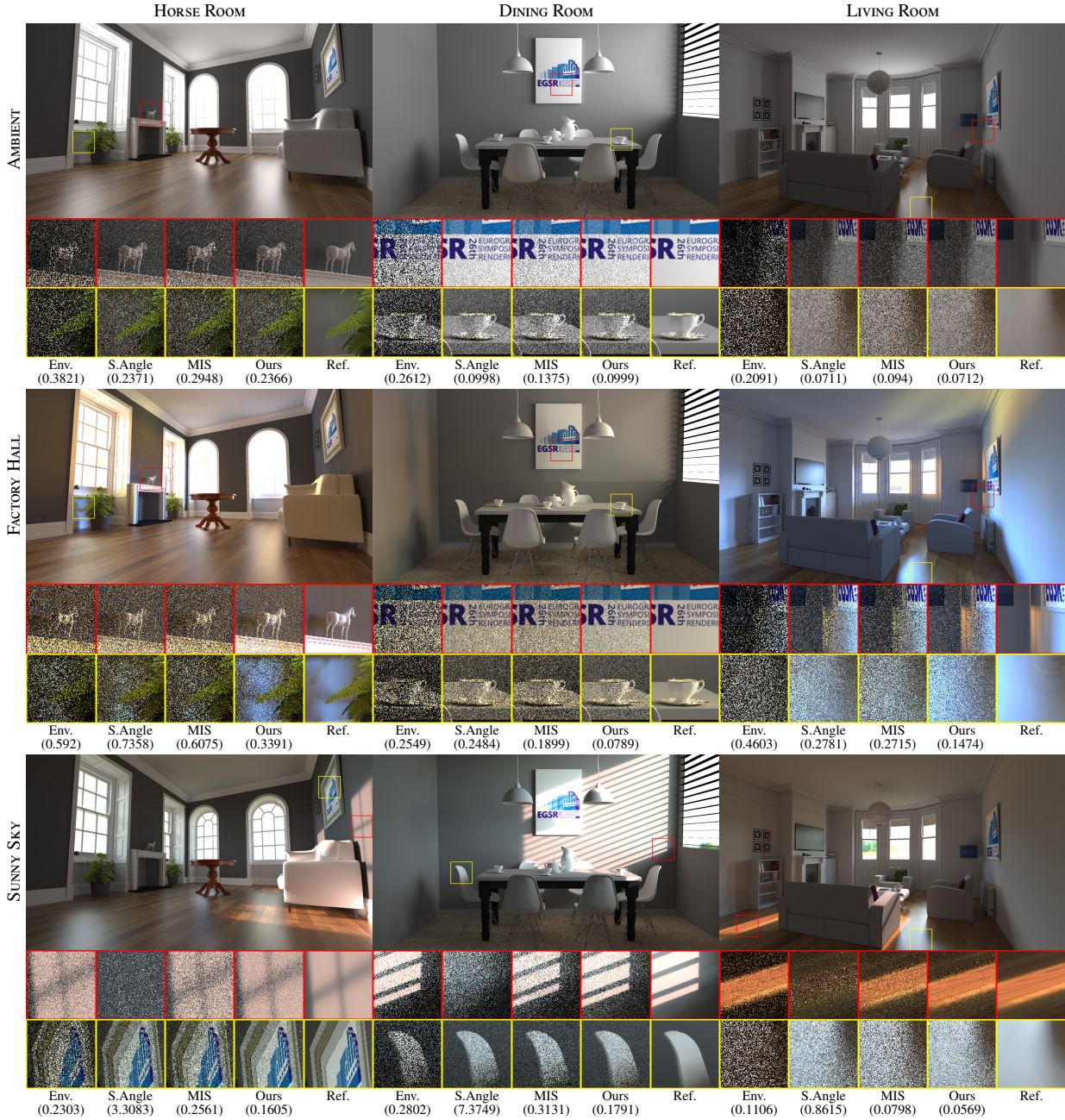
| | HORSE ROOM | DINING ROOM | LIVING ROOM |

Figure 1: *Three tested scenes in three different lighting environments rendered with i.i.d. samples.*

Table 1: *Performance characteristics for the renders from Figure 1.*

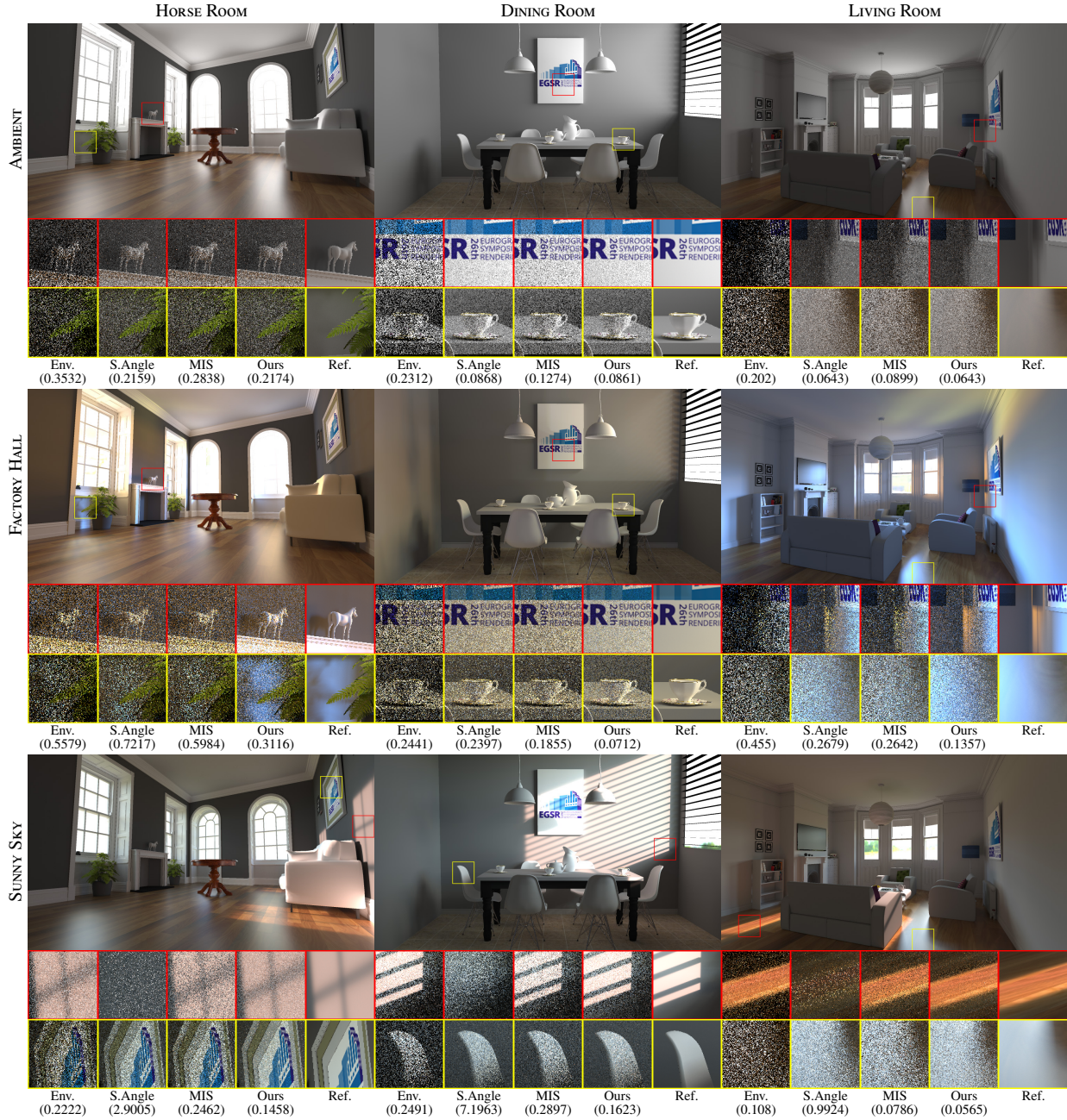| Envmap	Scene	Envmap Sampling			Portal S.Angle Sampling			Envmap/S.Angle MIS			Ours (solid angle select)				Ours (portal-vis. energy select)			
		RMSE	Cost	TTUV	RMSE	Cost	TTUV	RMSE	Cost	TTUV	RMSE	Cost	TTUV	Eff. Speedup	RMSE	Cost	TTUV	Eff. Speedup
AMBIENT	HORSE	0.3821	1.0	52.87	0.2371	1.5	**30.39**	0.2948	1.2	39.13	0.2366	1.6	33.02	1.6 / 0.9 / 1.2	0.2366	1.6	33.20	1.6 / 0.9 / 1.2
	DINING	0.2612	1.0	18.14	0.0998	1.2	**3.17**	0.1375	1.1	5.47	0.0999	1.3	3.57	5.1 / 0.9 / 1.5	0.0999	1.4	3.60	5.0 / 0.9 / 1.5
	LIVING	0.2091	1.0	16.45	0.0711	1.5	**2.90**	0.0940	1.3	4.17	0.0711	1.7	3.16	5.2 / 0.9 / 1.3	0.0712	1.7	3.16	5.2 / 0.9 / 1.3
FACTORY	HORSE	0.5920	1.0	135.40	0.7358	1.4	293.52	0.6075	1.2	170.40	0.3665	1.5	79.88	1.7 / 3.7 / 2.1	0.3391	1.5	**68.59**	2.0 / 4.3 / 2.5
	DINING	0.2549	1.0	18.60	0.2484	1.1	19.68	0.1899	1.1	10.94	0.0789	1.3	**2.24**	8.3 / 8.8 / 4.9	0.0789	1.3	2.25	8.3 / 8.8 / 4.9
	LIVING	0.4603	1.0	84.56	0.2781	1.4	44.36	0.2715	1.2	35.92	0.1597	1.6	16.06	5.3 / 2.8 / 2.2	0.1474	1.6	**13.57**	6.2 / 3.3 / 2.6
SUNNY	HORSE	0.2303	1.0	20.40	3.3083	1.4	5941.94	0.2561	1.2	30.72	0.2666	1.5	42.15	0.5 / 141.0 / 0.7	0.1605	1.6	**15.39**	1.3 / 386.1 / 2.0
	DINING	0.2802	1.0	22.99	7.3749	1.1	17329.34	0.3131	1.0	29.98	0.1791	1.3	11.74	2.0 /1476.2/ 2.6	0.1791	1.2	**11.66**	2.0 /1486.0/ 2.6
	LIVING	0.1106	1.0	4.84	0.8615	1.5	428.82	0.0798	1.2	3.13	0.0705	1.6	3.13	1.5 / 137.0 / 1.0	0.0569	1.6	**2.03**	2.4 / 211.1 / 1.5

Figure 2: *Three tested scenes in three different lighting environments rendered with low-discrepancy samples.*

Table 2: *Performance characteristics for the renders from Figure 2.*

Envmap	Scene	Envmap Sampling		Portal S.Angle Sampling		Envmap/S.Angle MIS		Ours (solid angle select)		Ours (portal-vis. energy select)	
		RMSE	Cost	RMSE	Cost	RMSE	Cost	RMSE	Cost	RMSE	Cost
AMBIENT	HORSE	0.3532	1.0	0.2159	1.5	0.2838	1.2	0.2174	1.6	0.2174	1.6
	DINING	0.2312	1.0	0.0868	1.2	0.1274	1.1	0.0861	1.3	0.0861	1.3
	LIVING	0.2020	1.0	0.0643	1.5	0.0899	1.3	0.0643	1.7	0.0643	1.7
FACTORY	HORSE	0.5579	1.0	0.7217	1.4	0.5984	1.2	0.3389	1.5	0.3116	1.5
	DINING	0.2441	1.0	0.2397	1.1	0.1855	1.0	0.0712	1.2	0.0712	1.2
	LIVING	0.4550	1.0	0.2679	1.4	0.2642	1.2	0.1484	1.6	0.1357	1.6
SUNNY	HORSE	0.2222	1.0	2.9005	1.4	0.2462	1.2	0.2472	1.5	0.1458	1.6
	DINING	0.2491	1.0	7.1963	1.1	0.2897	1.0	0.1623	1.2	0.1623	1.2
	LIVING	0.1080	1.0	0.9924	1.4	0.0786	1.3	0.0653	1.6	0.0565	1.6