

Bringing **RADIANCE** Power to the people

Carsten Bauer

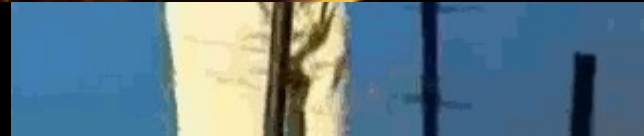
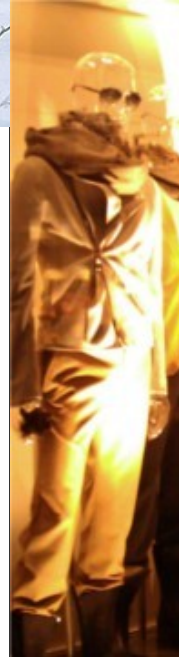
bauer@relux.ch

10th RADIANCE workshop, 24.-26. Aug. 2011, LBNL, Berkeley (CA), USA

**** pdf version, some images differ from original presentation ****



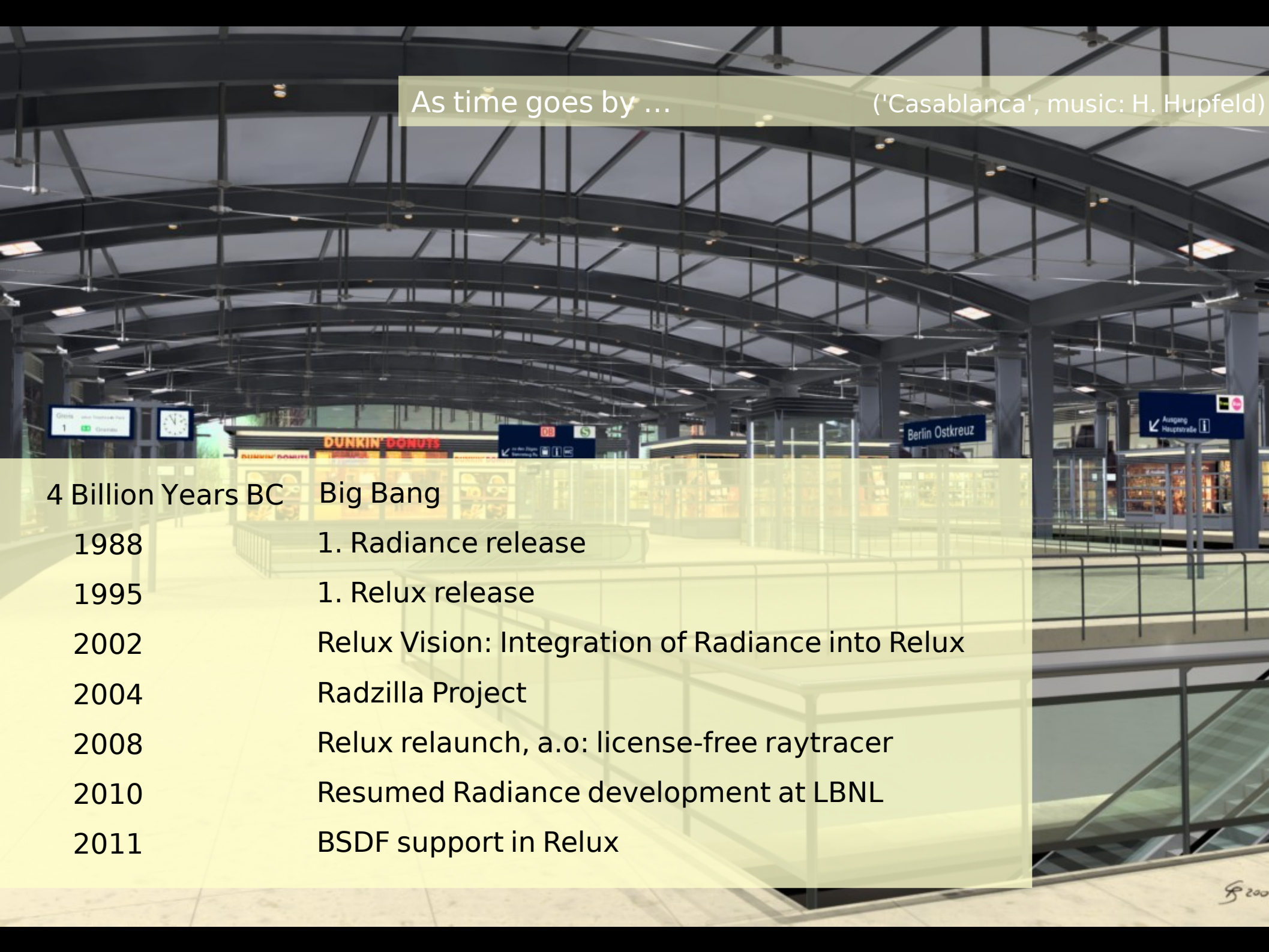
The Good



The Bad & the Ugly

As time goes by ...

('Casablanca', music: H. Hupfeld)



4 Billion Years BC	Big Bang
1988	1. Radiance release
1995	1. Relux release
2002	Relux Vision: Integration of Radiance into Relux
2004	Radzilla Project
2008	Relux relaunch, a.o: license-free raytracer
2010	Resumed Radiance development at LBNL
2011	BSDF support in Relux



One Step beyond ...

(Madness)

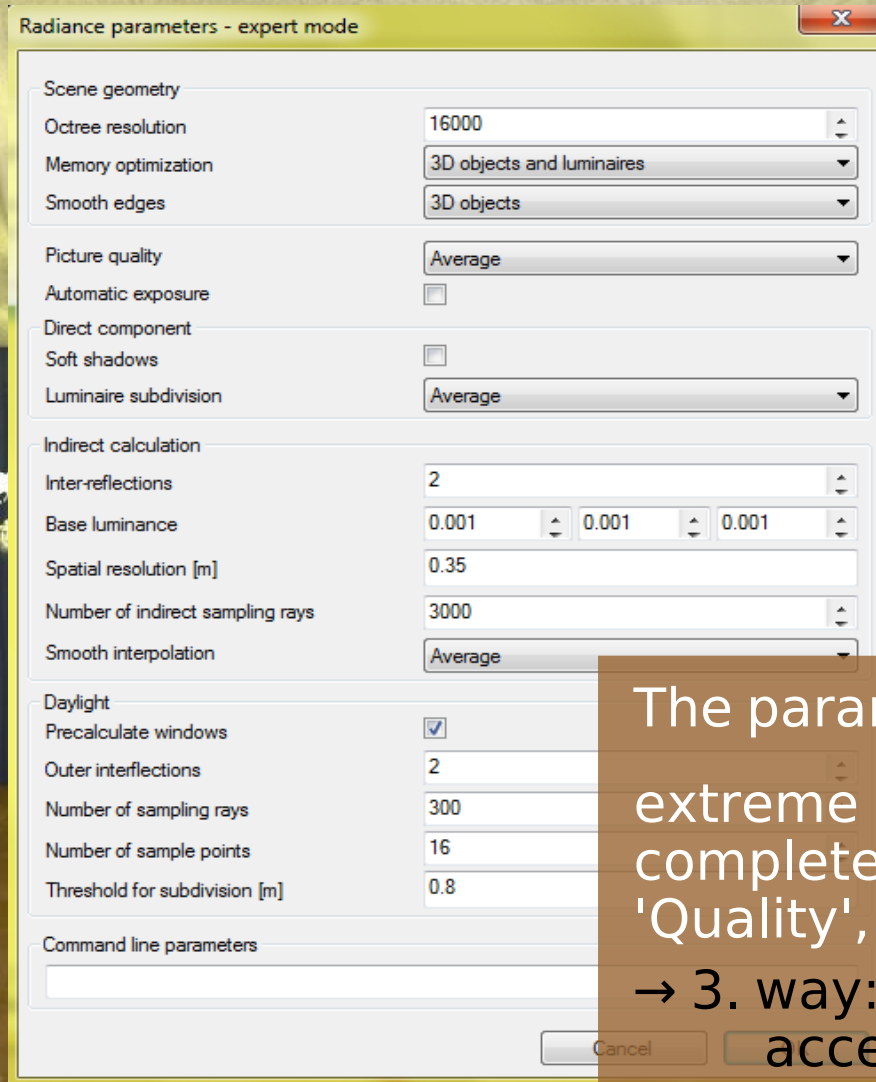
Different user group, different tasks, different framework,
different demands ...

So bringing RADIANCE power to the people needs:

- interface, guidelines, manual
- 'peripheral' changes, enhancements of existing functionality
- new modules, new features

We're absolute beginners ...

(David Bowie)



The parameters :

extreme 1)

complete shielding, use only 'Quality', 'Variability', etc

→ 3. way:

access to a small selection with most important & most intuitive ones accompagnied with automatic settings of others

extreme 2) complete access to all

We don't need no education ...

(Pink Floyd: 'The Wall')

M ... The Raytracing Manual

roduction into the Raytracing method for
rs without academic background

THE RAYTRACING METHOD

7/52

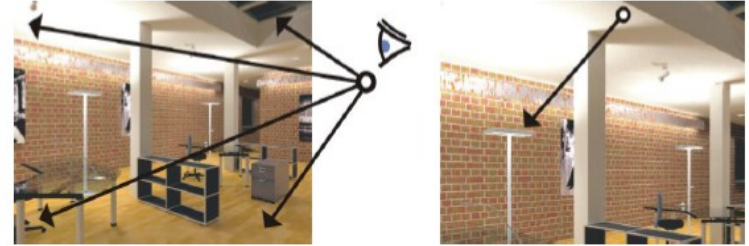


Fig. 3 Raytracing scenarios: examples for ray starting points

Primary view rays emitted from the observers point of view (left) and shadow testing rays sent out from points within the scene.

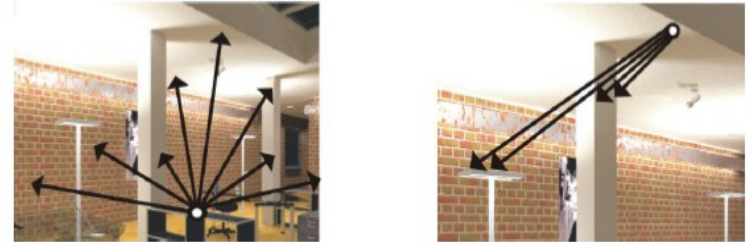



Fig. 4 Raytracing scenarios: examples for varying numbers of rays

Indirect sample rays for determining the surrounding luminance (left, see chapt. 5) and a bunch of shadow testing rays to simulate penumbras (right, see chapt. 4).



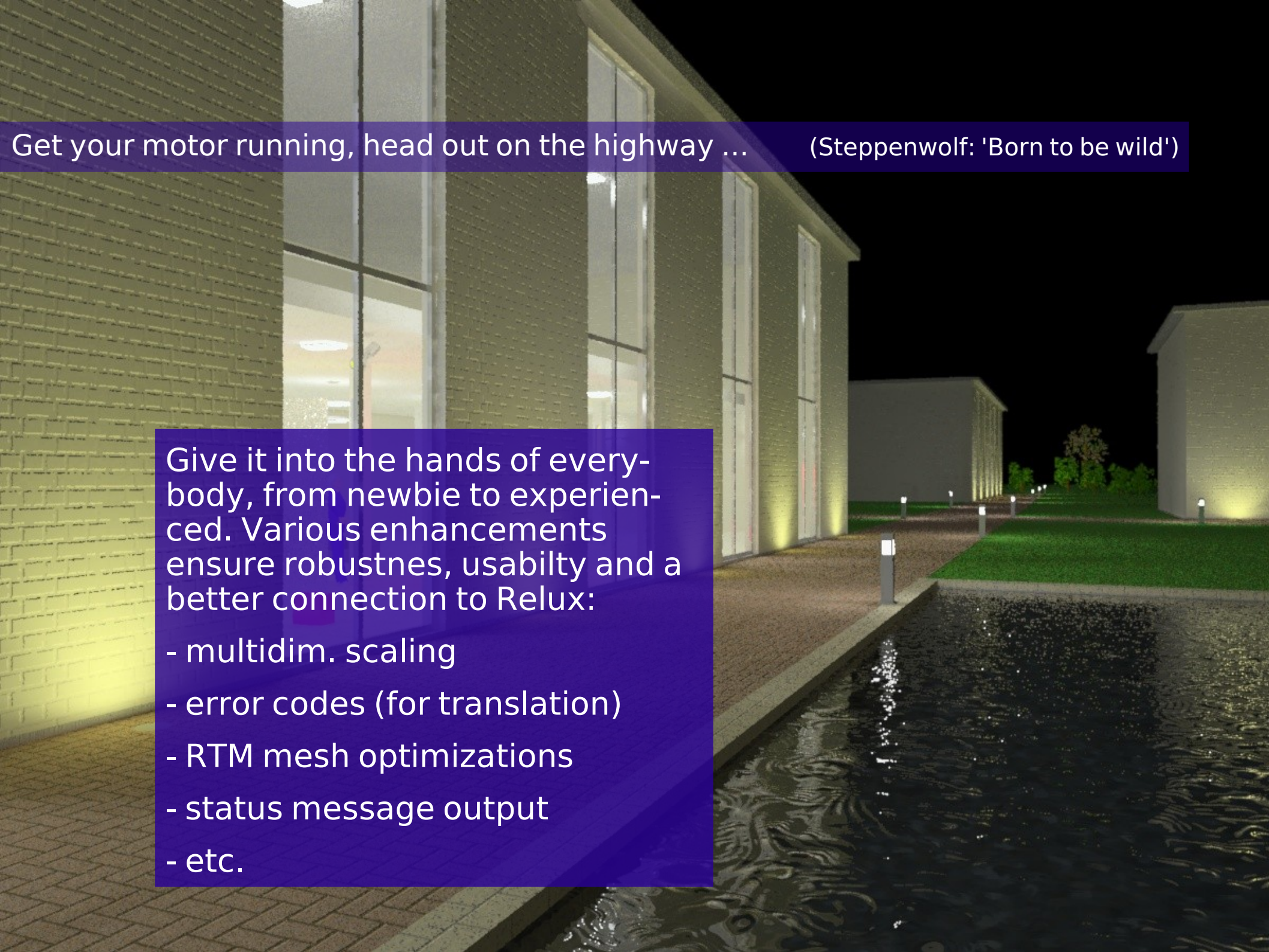
Fig. 5 Raytracing scenarios: examples for ray continuation

Several bounces of rays for the diffuse indirect illumination (left, see chapt. 5) and pursuing rays through transparent objects (right).



The 3 knowledge gaps of lighting simulation:

- 1) the lighting (physics) gap
- 2) the daylighting gap
- 3) the (lighting) simulation gap



Get your motor running, head out on the highway ... (Steppenwolf: 'Born to be wild')

Give it into the hands of everybody, from newbie to experienced. Various enhancements ensure robustness, usability and a better connection to Relux:

- multidim. scaling
- error codes (for translation)
- RTM mesh optimizations
- status message output
- etc.

Mirror, mirror, on the wall, who's the fairest of them all? (Cinderella)

Stray specular rays & Gaussian model:

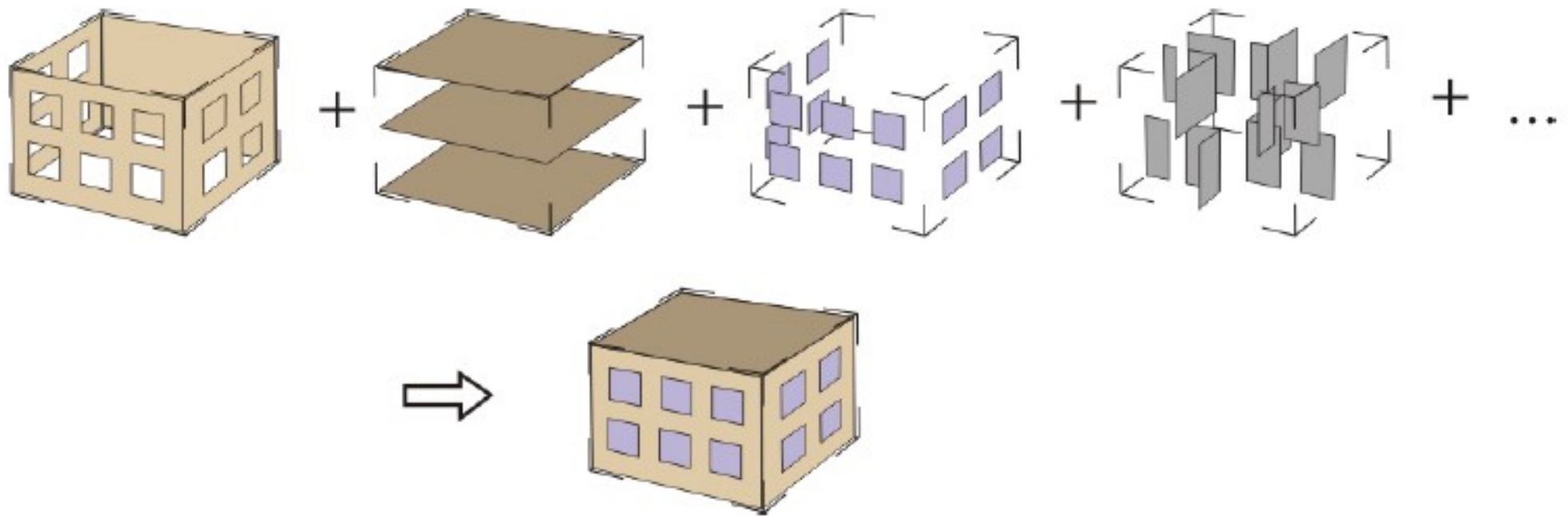
Correct appearance of reflexions on surfaces with roughness > 0 also for light/glow/illums.

- somewhat tricky to implement without overcounting
- switch between raytracing and Gauss model dep. on angular threshold



Wir können peepen bis es piept...

(Die Ärzte)

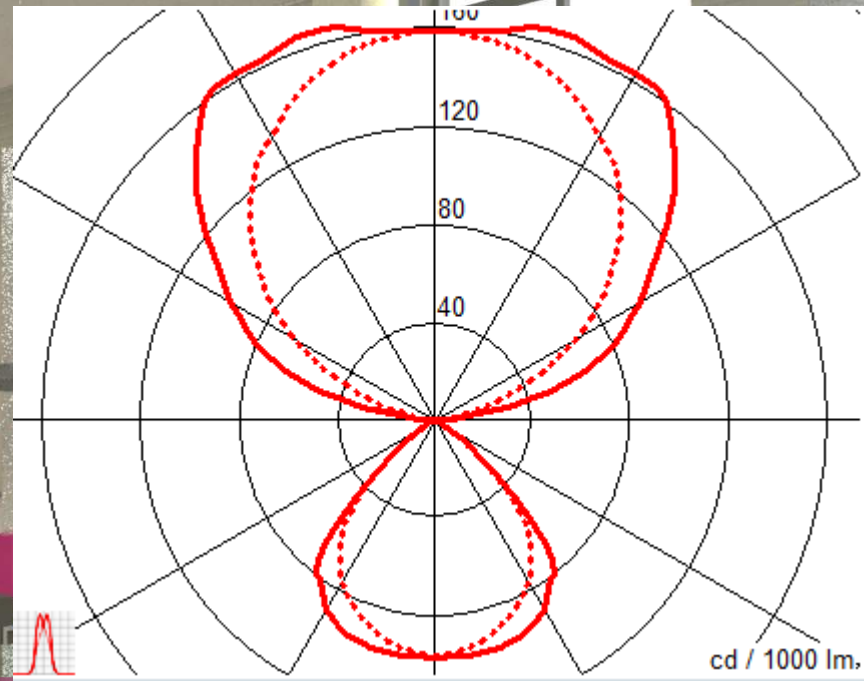


The 'overlapping bounding box problem':

- peeping into the octree of instances/RTM meshes needed to increase robustness in scene setups with instanced geometry

Don't touch the light ...

(Accept)



New luminaire model (NLM)

Special primitive family based on RTM mesh or instance for fixtures with 'measured geometry'

Accompanied by some optimizations in shadow testing & partitioning.

Take nothing less than the second best .

(Curtis Mayfield, 'Move on up')

The 'direct cache' (radiosity approximation)

- presented in RW 2002 & 2004.
- proved itself an important and reliable 'workhorse' for usual Relux scenes.





No need to ask he's a smooth operator ...

(Sade)

The ambient calculation as continuous construction site.

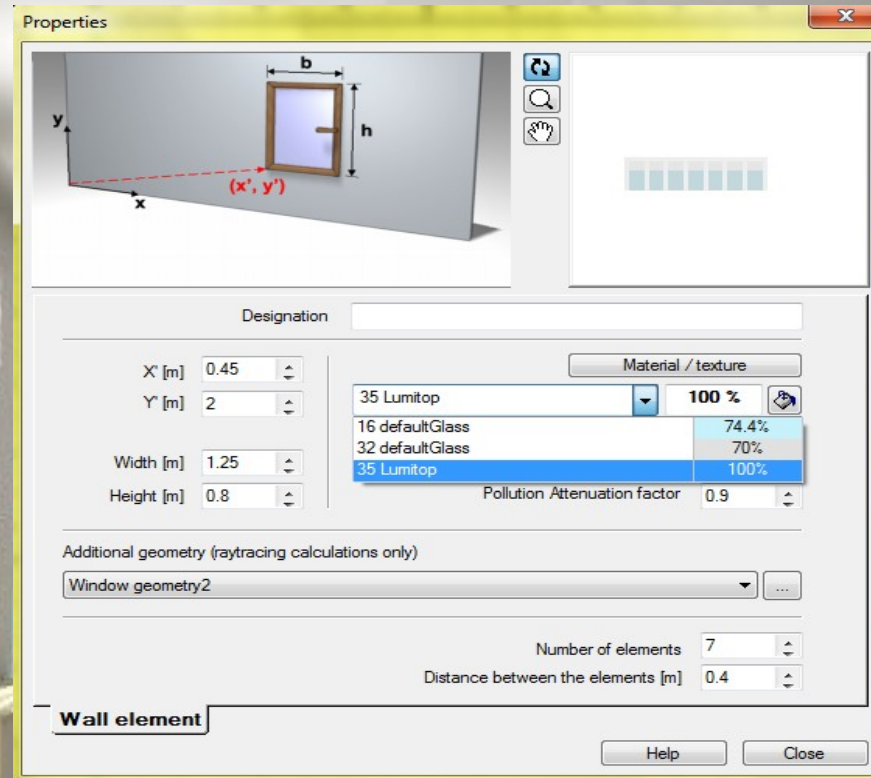
- more self-adaptation capabilities
- experimental 'smooth interpolation' feature (first try, needs improvement):
- curr. working on a comprehensive revision

The window precalculation:


- changed data output to classic luminaire LDC format with C-planes & g-angles
- improvements to produce smoother LDC appearance for standard scenarios with much fewer sample points & directions

Aquarius - Let the sunshine in ...

(from 'Hair')



- New: BTDF materials (data measured at LESO/EPFL)
- simple usage, select from material database
 - problem: visualisation
 - depends on participation of manufacturers



I'll be back ...

('The Terminator' , A. Schwarzenegger)

Tentative outlook:

- improved material models (cf. pres. By PAB & D. G. Moroder)
- re-vitalize broken features (e.g. classic 'mist', radzilla 'scene')
- self-adaptation capabilities ('auto' mode for parameters)
- replace stochastic with deterministic techniques

The End