



Fig. 10. Average computation time per beam at different reflection orders.

implementation of beam tracing from the acoustic source makes use of BSP. The wall-reflected beams, on the other hand, need to be tested only for incidence on pre-computed visibility regions. The difference is more pronounced for cube3B environment, due to the more complex visibility conditions. Conversely, for the simplest environment, cube1, the visibility precomputation does not bring any relevant advantage since all the walls are visible without occlusions.

5 CONCLUSIONS

In this manuscript we proposed a generalization of the visibility-based beam tracing method [36] to the case of 3D geometry. This new definition of ray space, presented us with new challenges for defining visibility regions and, more generally, the data structure that encodes the R2R visibility in 3D space. We developed a solution for building beam trees through a lookup of such a visibility data structure, and tested it for computational efficiency, proving that it gives us the same advantages that its 2D counterpart [36] was able to offer, thus enabling a new class of solutions for interactive acoustic simulation in 3D space.

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