

**ACOUSTICS2008/1199**  
**Investigation on the restitution system influence over perceived**  
**Higher Order Ambisonics sound field: a subjective evaluation**  
**involving from first to fourth order systems**

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Among the spatial audio reproduction techniques over loudspeakers, the Higher Order Ambisonics (HOA) approach is based on a sound field spherical harmonics decomposition. By truncating the decomposition to the  $M$ th order, it remains a finite number of components that form the spatial HOA format. The more components are used to encode the sound field, the finer the spatial resolution is. Similarly, the size of the area where the sound field is accurately recreated is proportional to the order. For an  $M$ th encoding order,  $N=2M+2$  equally distributed loudspeakers are recommended for a homogeneous reproduction in the horizontal plane. Adding loudspeakers does not change the spatial resolution. However, what is the influence of the restitution system on the perceived sound field? An experiment was designed in order to compare four systems (from first to fourth order) and a reference one, using similarity ratings obtained from pairwise comparisons. Two sound scenes were used, simulating an audio conference and a scene in a kitchen at home. 25 listeners participated to the experiment. The results were analysed using the Indscal method. The perceptual space appeared to be a two dimensional one, highlighting the influence of the order and the number of loudspeakers on the reproduced scenes.