

Design and characterization of a compact spherical loudspeaker array

Research internship proposal at LMFA

This project aims at studying and building a compact spherical loudspeaker array, where the loudspeakers are arranged and baffled on a rigid spherical structure (see Fig. 1). Unlike omnidirectional acoustic sources, the different loudspeakers are controlled independently here. With a formalism using the spherical harmonics, it becomes possible to generate an equivalent acoustic source, with a chosen directivity [1]. An approach using radiation modes may also be considered [2]. Several applications are envisaged, from the reproduction of directional sources to the improvement of acoustic fields synthesis [3].

In a first stage, simulations will be done in order to optimize the number of speakers, their size, the geometrical arrangement and the radius of the spherical baffle. Then, a functional prototype will be build, following for instance the proposal made in [4]. Finally, experimental characterization will be carried out in terms of radiated pressure field and directivity performances.



Figure 1: Example of compact spherical loudspeaker array, from [4].

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References

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