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**Resolution improvement of beamformers using spherical  
microphone array**

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Spherical microphone array has been studied for various applications. In enclosed space, spherical array eliminates forward-backward grating lobes occurring in two-dimensional arrays. Beamforming and spherical harmonic decomposition are both used to map the distribution of source strength. The two approaches show similar performance at frequencies where the upper spherical harmonic order equals the product of the wave number and sphere radius. However, at lower frequencies, processing using spherical harmonics maintains the same directivity while the spatial resolution for delay-and-sum beamformer deteriorates. It has been shown that the scattering of sound by a rigid sphere improves the directivity of the same open sphere microphone beamformer, by increasing the path length travelled by incident sound. This paper concerns focused beamformer using rigid and open sphere. The concept of statistically optimized array processing (SOAP) is applied to adapt to a particular interior geometry, considering the scattered field in case of rigid sphere. The regularization process makes it possible to use a model of partially coherent sound field in the enclosed space. A deconvolution post-processing based on the knowledge of the actual steering vector leads to an efficient and robust solution to improve considerably the resolution of the source strength distribution.