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Lateral Energy Ceiling Design in Fan Shaped or Circular Rooms

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ABSTRACT
The subject of this study is an extension of a strategy developed on two Canadian projects from the requirements for speech intelligibility to the requirements for music. In particular, to address the need for early lateral energy. Steeply raked fan or vineyard shaped geometries do not offer very much in the way of wall surfaces to reflect useful early reflected sound. This geometrical limitation was overcome successfully in both cases through the strategic design of the ceilings. In these rooms and others, the ceiling surface is, proportionally, much larger than the walls. In the case of the Canadian rooms, the requisite early energy was provided without consideration for the direction of arrival. But there is no reason why the same design strategy cannot be employed to provide early lateral energy in a room for music. The study addresses the concern, offered by some, that venues where the audience surrounds the orchestra, the sound does not always surround the audience. In this, the first of two studies, the geometry is limited, as much as possible, to simple quadric geometry. The second study, also presented at this symposium, will optimise the geometry using gradient-free stochastic optimization techniques.

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