

# Spatial Sound: How Surround System enhances people experience with music, improving the emotional engagement as well as the clarity and narrative side of music.

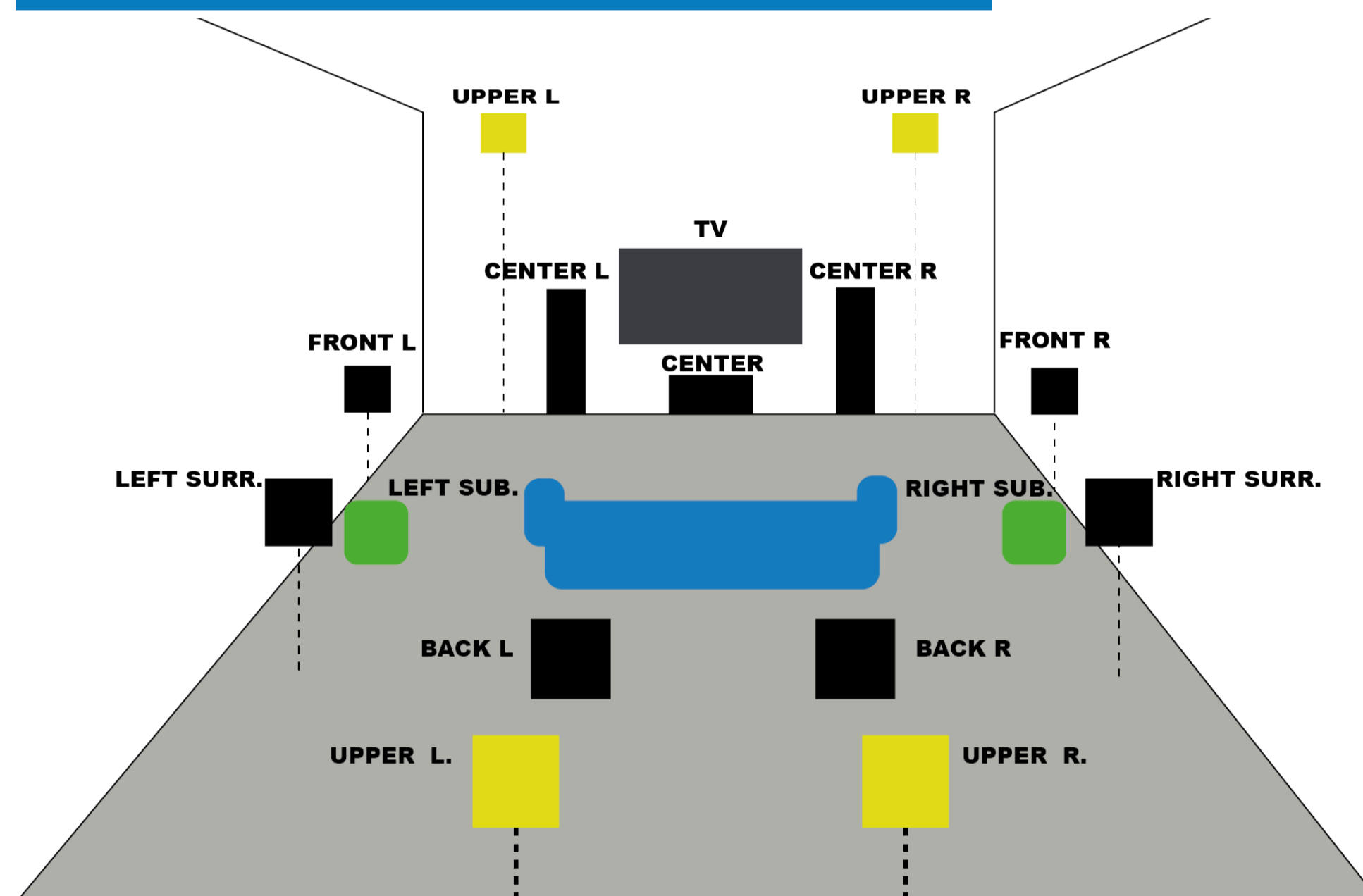
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## Abstract

In the past decade the industry of music has observed a significant growth of the Spatial Sound field, nevertheless this advanced way to experience music became accessible to the most just recently.

In a quite unexplored topic but yet rich in promises and potential, this experimental research aims to uncover and understand in what ways Spatial Audio systems improve people's experiences with music. Particularly focussing on the connection that occurs with the emotional engagement, narration and clarity of a piece of music.

## Physical Configuration



## Partial Test Result

### DOLBY SETTING

| SONG                           | NARRATIVE | CLARITY | EMOTIONAL ENGAG. |
|--------------------------------|-----------|---------|------------------|
| Doors - Riders on the storm    | 4/5       | 5/5     | 4/5              |
| Hans Zimmer - Dream of Arrakis | 3/5       | 5/5     | 5/5              |
| Bonobo - Age of phases         | 3/5       | 4/5     | 4/5              |
| Queen - Bohemian Rhapsody      | 4/5       | 4/5     | 4/5              |
| Harry Style - As it was        | 2/5       | 5/5     | 5/5              |
| Lady Gaga - Born this way      | 3/5       | 3/5     | 2/5              |

## Background & Introduction

Spatial Sound is a technique that focuses on the depth of a sound reproduction. It uses several audio channels that surrounds the listener in order to create an acoustic immersive experience. The question of this experimental research aims to **identify what Spatial Sound adds to the music experience compared to a Stereo experience** (left / right channels only).

Previous study such as *An Empirical Measurement Tool for Overall Listening Experience of Immersive Audio 2021* by Kailas, G et al. and *A Statistical Analysis of the Relationship between Harmonic Surprise and Preference in Popular Music 2017* by Miles, S et al. helped to give a strong basis for this experimental research.

Therefore, in this study we observe users while listening to music in Dolby Atmos versions vs Stereo versions using an high quality surround system composed by 15 speakers.

During the study, participants are listening to music pieces previously selected, firstly in Dolby version, later in a stereo version. Simultaneously, we observe their brain activity (EEG) using a Neuro Cap to identify proves of a stronger emotional engagement and possible differences when eyes are opened and closed.

## Research Methodology

Listening to several genre of music, I have identified songs for the Narrative and Clarity categories. The test session started with the explanation of the aim of this research and general insights, background and introduction to the participant. Later I conducted a pre-test to verify the auditory abilities of the participant to avoid compromised results.

The test included the performance of six pieces of music, generally popular, played before in Dolby Atmos and after in Stereo version. During the listening experience, the participant was wearing a Neuro Cap that was recording brain activity (EEG). The recording was taken both in Dolby and Stereo mode, as well as with eyes opened and closed.

Moreover, during and after the listening the participant was answering to qualitative and open-ended questions in order to gain detailed insights of the experience.

## Conclusion

In conclusion, the data collected up until now seems to meet the hypothesis of this study: Spatial Audio systems improve people's experiences with music.

Particularly the connection that occurs with the emotional engagement, narration and clarity of a piece of music.

As expected, data seems to show an improvement of the narrative side just with certain genre of music, as well for the clarity and emotional engagement side.

Songs with a strong narrative (ex. Riders on the storm, Dream of Arrakis) are enhanced by Spatial Sound systems.

Music that don't present an significant sense of storytelling/narrative are not enhanced by Spatial Sound systems (ex. Born this way, As it was)

Nevertheless, for qualitative results and detailed insights, it is necessary to have completed the tests.