In recording studios, the sound from each instrument is recorded with its own microphone (sometimes more than one microphone is used, *e.g.* for drums, Hammond B3 organ/Leslie rotating speaker sounds, …), the recorded signals are then mixed together and then mastered to create a stereophonic signal.

One important criterion for realism in reproduced sound is that the spatial-temporal aspects of the original sound should be reproduced by the sound system. Obviously, stereophonic sound systems accomplish this to a much greater degree than monophonic systems, however the listener must be seated in a the "sweet spot" of the stereophonic sound field in order to take full advantage of the stereophonic effect, which is usually located in the median plane between the *L* and *R* speakers, for a rectangular listening room, and such that the angular separation of the speakers, viewed from the listener's position is ~ 40–90 degrees, which frequently presents difficulties *e.g.* in arranging a home living room for good stereophonic sound.

In a rectangular room, the optimal location for speakers is usually in the corners of the end wall of the room, because corner placement enhances the low-frequency sound (due to pressure anti-nodes in the corners of the room for the various room modes). The figure below shows the "sweet spot" favorable listening area associated with three different loudspeaker arrangements for a rectangular room with $L \times W$ dimension ratio of 3:2. The optimal arrangement is that shown in diagram (a), which has the overall largest "sweet spot", and with the speakers in the corners of the end wall of the room. Note however, that if the angular separation of the speakers is *too* narrow, the sound "image" will appear to be monophonic rather than stereophonic.

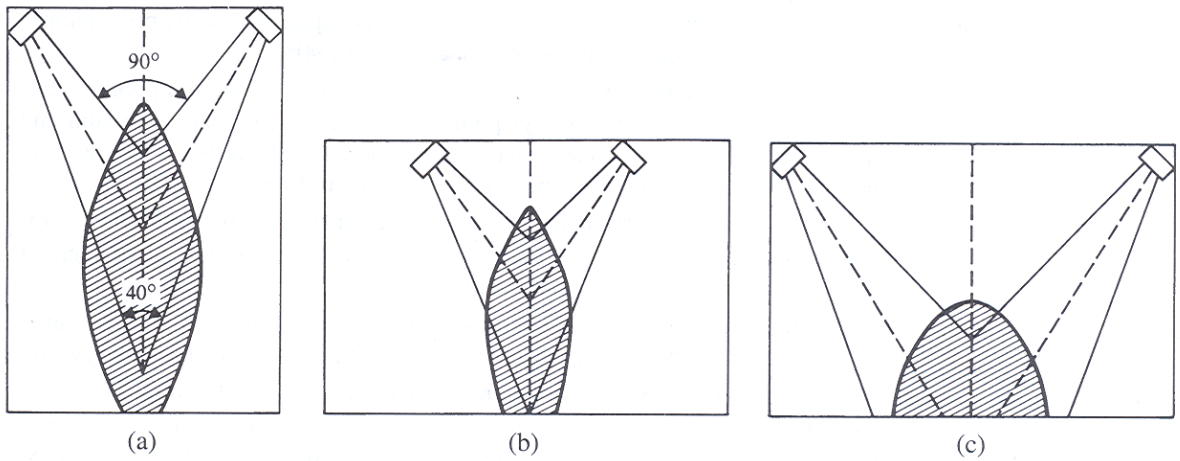

FIGURE 25.9 Favorable stereo listening areas for three different loudspeaker arrangements in a rectangular room with dimension in the ratio 3 : 2. (After Rossing 1981.)

An "improved" version of the stereo "2.0" sound system is the stereo "2.1" sound system, which simply augments the two main *L*/*R* loudspeakers with a subwoofer, as shown in the figure below:

Human binaural hearing does not do well in the spatial localization of low frequency sounds output from L/R speakers ($f < 100$ *Hz*), hence the 2.1 sound system simply routes the *L*/*R* low frequencies to the single subwoofer, freeing up this task for the *L*/*R* speakers – their design can then be optimized for reproduction of all higher frequencies….