

# Ultra-flat loudspeakers with powerful sound reproduction

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Bigger speakers, bigger sound - this is the music lover's creed. Flat panel loudspeakers offer an alternative to those who would rather not or cannot clutter up their homes with speakers. These speakers can be integrated inconspicuously on walls or in furniture. (© Fraunhofer IDMT)

(PhysOrg.com) -- Bigger speakers, bigger sound - this is the music lover's creed. Flat panel loudspeakers offer an alternative to those who would rather not or cannot clutter up their homes with speakers. These speakers can be integrated inconspicuously on walls or in furniture. At the Internationale Funkausstellung IFA in Berlin, Germany, from September 4 to 9, Fraunhofer scientists are presenting a completely new concept for ultra-flat loudspeakers that still deliver full sound reproduction.

Stereo, Dolby Digital, 5.1 or surround sound - music lovers have to accommodate an increasing number of loudspeakers in their rooms in order to obtain the most perfect sound. Good sound reproduction takes space, at least in the speakers. The loudspeaker membrane must have room to vibrate in order to maintain unimpaired enjoyment. Flat panel loudspeakers can be integrated almost invisibly into the surroundings to keep the multitude of loudspeakers from dominating the room.

However, the quality of the sound in conventional models suffers if speakers are installed on walls or in furniture. In cooperation with Sennheiser electronic, scientists at the Fraunhofer Institute for Digital Media Technology IDMT in Ilmenau, Germany have now developed a special loudspeaker: ultra-flat, but resonant nevertheless.

“This new generation offers tonal balance and acoustic pressure at a level that will even allow the use in the professional movie or concert segment in the future,” reports Dr. Sandra Brix from IDMT. To make this possible, Brix and her team took their inspiration from the loudspeakers of premium headphones. “We are opening up a new application area for our highest quality electrodynamic headphone miniature loudspeakers in this alliance with Fraunhofer. Because of their compact overall depth, they are excellently suited for use in the flattest loudspeaker boxes, without any losses in tonal persuasiveness,” says Prof. Dr. Jürgen Peissig, head of the Signal Processing and [High Frequency](#) research department at Sennheiser electronic. They are arranged in groups, or "arrays" in the trade jargon, so that they allow audio quality that has not been seen in the past. “Even if these flat panel loudspeakers are placed directly on the wall or integrated into media equipment or furniture, they can reproduce a frequency range from 100 hertz to 20 kilohertz,” according to Brix. “This distinguishes our new concept from conventional flat panel loudspeakers that achieve response characteristics at this level only if kept at a certain minimum distance from the wall.”

Consequently, the ultra-flat loudspeakers are ideally suitable for

multichannel systems and the IOSONO audio system. Based on the principle of wave field synthesis, IOSONO produces a realistic and spatial sound field throughout the entire listening area with the help of a large number of small loudspeakers arranged in a ring. Thanks to the new design and sound, this large number of loudspeakers can now be discreetly integrated into the surroundings. In the future, Dr. Brix is convinced, it will be possible to use this technology in all areas that call for an integration and reproduction of sound as invisible as possible. Automotive and aircraft construction are not the only areas calling for good [sound](#) at low weights and installation depths. Spas and hotels also seek to create surroundings that fascinate both eyes and ears equally. For example, the flat panel loudspeaker could inconspicuously disappear into the ambient design in form of a picture or decorative element.

Visitors to IFA in Berlin can experience the first prototypes of the ultra-flat loudspeakers -- in the TecWatch Hall 5.3, booth 14.

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