

### 9.1.5: The Missing Fundamental

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One important auditory phenomena that cannot easily be explained by either theory of hearing is the ***missing fundamental*** or ***virtual pitch***. Some sources refer to the effect as ***residue pitch***. As we saw in the chapter on Fourier analysis, musical instruments have overtones which are harmonic, meaning they are multiples of the fundamental frequency. When you hear a guitar play a note with a fundamental frequency of 100 Hz there are harmonic frequencies of 200 Hz, 300 Hz, 400 Hz etc. present in the sound. Your ear-brain system perceives this as a single pitch of 100 Hz instead of a collection of individual frequencies. An interesting auditory phenomena is that if you are listening to a series of frequencies of 200 Hz, 300 Hz, 400 Hz etc. your ear-brain system will ALSO perceive a single note of 100 Hz *even if the 100 Hz fundamental is missing*.

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