**Possibilities of guitar in alternative tuning systems**

 Guitar is probably most widely used musical instrument in the world. It is easy to manage some basic playing skills and it also gives opportunity to play not only monophonic melody, but (with some limits) to play a harmony. These are the main reasons why this article is focused on guitar.

 At first it will be necessary to explain the difference between alternative tuning, and alternative tuning systems. Alternative tuning on guitar usually means alternative tuning of the open strings – for example instead of using traditional *E A D G B E*, retune open strings to *D A D G A D*, which gives the player new possibilities in playing harmony. However, the whole tuning system, which means twelve-tone equal temperament, is maintained. Retuning to alternative tuning system means to retune whole system (for example in just intonation, quartertone system etc.), which usually needs to do some shifting whit frets.

 So the first possibility is just to re-fretting the instrument. There are only two main problems – traditional luthiers do not want to do this, mainly because lot of them do not understand the ratios between tones and do not know how to calculate new fretting (when somebody want to have for example guitar in nineteen tone equally tempered system). The second, if it is done, it is “only” guitar in nineteen tone equally tempered system. However, here are almost unlimited possibilities of alternative tuning systems. Contemporary composers focused on this problematic usually work with many different systems.

 Another possibility is to make fretless instrument. This might lead to the advantage that the player can play just any interval he needs. Nevertheless he must be well ear trained in case he does not have any pitch support, for example a different instrument with fixed tuning. Disadvantage is, that it is quite tricky to hold only basic triads in tune and to use all six strings in chord progress is almost impossible. However, on fretless guitar it is possible to make bandages (like on viola da gamba) which can substitute frets, and can be shifted. The disadvantage is, that those bandages are not possible to make in whole range of the instrument, that means higher positions are still fretless and those “frets” are straight through whole six strings. That can make problems to adapt just intonation.

 Different solution, which is maybe the simplest one, does not need any replacement of frets, or any “destructive” intervention is to make floating bridge. This can be used only for macrotonal equally tempered systems (that means one step is bigger than 100 cents) and make some difference in guitars sonority qualities. However, it is probably the simplest way how to retune guitar in some alternative tuning systems.

 Next possibility was invented by Ron Sword, guitarist and microtonal theoretician. His concept is based on switchable fretboards. This is excellent concept for quick changing of few systems on one instrument. Also it is limited with numbers of fretboards and its systems – so it is almost the same problem, as with differently fretted guitars. Just muscian do not have to have a lot of different guitars, but only fretboards.

 Another different concept is now used by guitarist Tolgahan Çoğulu. His guitar can adapt almost all kinds of tuning systems because on this instrument are specially designed frets for each string holding in sockets and can those can be shifted almost limitlessly. Big disadvantage of this system is its pricing and his guitar is not six-string but eight-string, so this is not “experimental instrument”, but rather professional guitar for specialized instrumentalists.

 The last concept which will be mentioned in this article is my own. It also can give the opportunity of shifting frets almost limitlessly but frets are at least under two strings (but they do not have to be laid in narrow way which can give the opportunity to adapt just intonation systems). Frets are holding by magnetic power. Magnets are in fretboard and frets have a small iron pads under. This makes impossible to have short distances between frets, but it is still usable for variety of microtonal system. The advantage of this system is also its pricing which makes this concept perfect for experimental composers or theoreticians.

 Of course that there are maybe different concepts worldwide how to retune guitars in alternative tuning systems but these are some examples which can give the idea how to solve some tuning problems and I personally hope, that in the future will be this topic more developed by other musicians and music theorists.

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