Summary of ”The sacculus” report titled: “Blast from the past”. & Thoughts regarding the monotonic and looped beats, tendency to set humans in trance.

“Blast from the past”

Psychologist Neil Todd has discovered that “The sacculus” an organ forming part of the balance regulation system, is responding to sound frequencies that predominate in music. This statement should be considered with this in mind: The sacculus is not thought to have any hearing function!
Todd suggest that although the fishes are using there sacculus for hearing, this is a conserved heritage that is now “degraded” to only balance regulation in human beings.
The Sacculus is connected via the vestibule system to the hypothalamus, and as we know this part of the brain is the drive for hunger, sex and hedonistic actions.
The theory that N. Todd presents is that the Sacculus might be one of the reasons to why some humans get some of their emotional spectrum “coloured”, through its connections between the balance organ and hypothalamus, by listening to music. This would also suggest that people who gets a buzz out of spinning around in rollercoaster’s and so forth, is more likely to enjoy loud music in concerts and dancehalls.
The music or sound has to be presented in loud volumes 90 db and above. to get the sacculus stimulation.
The tendency for some people to get a thrill out of hearing their own voice chanting and singing might be a result of that Sacculus stimulation, hence the volume in larynx during loud phonation has been estimated to reach about 130 db.
The natural limitations in the method, used in this research leaves a lot more to wish for. Because of its disposition the Sacculus is impossible to reach for direct measuring on the reaction to direct sound. Nevertheless it is a very interesting angle of the relationship between the way human react on loud sound levels, as being the norm for experiencing music as well at concerts as in discotheques.
As we already know, the balance is put to the test when we spin around, go fast up and down, or in any other way disturb our balance with unusual movement. It even continues to be confusion in the balance organ after the action is stopped. Even though the balance organ consist of a lot more than the Sacculus and the variables are extremely complex, the correlation between the regulation of balance and reaction to loud sound levels can be related.
When Sacculus is “at work” it evokes electrical signals in the neck muscles. So by measuring the activity in some neck muscles during sound instead of balance, the researchers were able to conclude “the Sacculus phenomena”.
In the test group consisting of 11 students, The frequency response was greatest between 50 hertz and 1000 hertz, with a peak around 325 hertz. This suggest that when people get together and chant or sing, the Sacculus gets stimulated, this reflects on the hypothalamus and thereby trigger the “pleasure” part of the brain.
In the last part of the report Neil Todd refer to the fact that rock concerts and music at dance clubs are: “An absolutely smack bang in the Sacculus range of sensitivity”. This leaves me with a question mark! I have not seen a spectrum analysis from an average rock concert or music played at discotheques, but in my subjective opinion the music in these situations would be less prominent in the range of 300 hertz to 1000 hertz than in the even lower frequencies. Of the top of my mind I would suggest that the equalisation would have a peak from 50 hertz to 200 hertz and maybe another peak in the higher frequency range. This is just an opinion and it has no validation what so ever.

Though the Sacculus is responding to the reports suggested frequencies, it would also be interesting to investigate why the lower frequencies typically presented by bass and bass-drums are so liked and almost necessary for the body's urge to move to music (dance).
It leaves a question mark more: Is it likely that people who don't like the balance triggering activities would approve less of loud music?

Thoughts regarding the monotonic and looped beats, tendency to set humans in trance

Another close related question between the Sacculus phenomena and human perception of time, timekeeping and rhythmic patterns is: "What is it in these monotonic and looped beats presentations that make people go into trance?
The rhythmic pattern is often presented by a percussive sound image, such as bass and drum loops, typically used in dance music and tribal tradition in different cultures all over the world, quite often accompanied by chanting or singing. What factor is playing the main role in this? Is it the rhythmic repeated pattern? Does it matter what type of pattern it is, regards to repetitiveness, tempo and note values? Is it the frequencies of the drum and bass? Does harmony have any inflection on the level of experience, due to the emotional perception?
According to A. Friberg and J. Sundberg, the perception of time related movement in a rhythmic sequence is about 250 ms.
This might give us a hint about how small, or big the rhythmic change can be and still not effect the percept emotion of the rhythm. Even if we move a part of the pattern our perception tends to accept it and start a new "count" or "beat". So with the Sacculus in mind, I suggest that: As long as the repetitiveness is there and the volume is loud, the acceptance to very complex rhythm pattern seems to be generous.
What is it then? Is it the volume or/and the frequency as the Sacculus theory is built on? Is it the actual specific rhythm? or the repetitive patterns, that effects us to the extend of trance? Does the inflection of harmony have any relevance in this experience?
I intend to further investigate this theory in the final report.

References

1. New Scientist, February 2000: Blast from the past, Paul Marks.
2. A. Friberg and J. Sundberg. 1995. Time discrimination in a monotonic, isochronous sequence. J. Acoust. Soc. Am. 2524 -2531.