Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.15470

Teaching geo-chemico-physics with a musical point-of-view

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Inumerous analogies with music can be done to explain pure classical/quantum physics, chemistry, geology and biology. Matter properties are related to energy changes, vibrations, resonance, wave propagations following a clock. The wave-matter duality can be illustrated using sound properties and any physical properties can be transformed into music, as a song follows thermodynamics (notes) and dynamics (note duration, pause, and rhythm). Simple concepts can be used, with minimalist songs for the young generation. For example, the periodic table of elements has been converted to audible frequencies, giving an atonal sound (i.e., the energy E is proportional to the Planck constant *h* and the frequency *)* and tuned for aesthetical purposes. Tuning and aesthetic are demonstrated using the physics in open/closed tubes and strings in following the mathematical Pythagorean scale. The geophony of crustal reactions, water waves observed with seismical analysis make sounds with fundamental frequencies and their resonances (natural hydrogen genesis will be examplified). Life and intelligence´s evolutions are an increase of the entropy, like the sophistication of music upon time. Many other properties can be emphasized. For example, in Nuclear Magnetic Resonance spectroscopy, a geophysical technique, many factors affect the chemical shift of an element (e.g. local geometry, electronegativity, hybridization). The extracted notes from resonance frequencies express the chemical environment of an element in a compound while spin echo NMR gives the rhythm. Defects, resonances are welcome to personalise the timbre of instruments and for an interpretation, highlighting emotion, catalysing inspiration. As music is a way of communication between species, a way to transmit emotions, to cure diseases, the scientific aspect will be expressed in songs mixing logical natural patterns and imagination. With afro-latin beats, hydrogen will be valorised from the Big Bang to its green use in fuel cells.

Acknowledgement: Corinne Arrouvel thanks warmly Geraldo Martins (compositor, Brazil) for helping with some musical aspect in 2019. The more recent extension project (´A física dos instrumentos musicais e sua influência na cultura brasileira´) is in a joint international multidisciplinary collaboration between UFSCar (Brazil) and JAM music Lab university (Austria).