Contributed Talk

Splinter Education

Structure-forming phenomena in the universe and simple applications at school

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In the universe and on earth, patterns and structures are formed. These self-running phenomena are not to be understand easily, because there are very complex processes going on. But for teachers, it is possible to put some experiments together, which can explain this complexity of the structure-forming phenomena. This contribution presents three experiments treating structure-forming phenomena: Kelvin-Helmholtz Instability, Rayleigh-Taylor Instability and Rayleigh-Benard Convection. To reach a better understanding for the students. This contribution shows pre-experiments leading to a better understanding of the main experiments. The presented phenomena should only treat a small section of the possible structures found in the animated and unanimated nature. The self-organization of structures can wake the interest of the students in astronomy, astrophysics or physics in general, because observing these structures can be very fascinating.

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Stable Atmospheres inside and outside the Solar System

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The search for life on other planets is one of the most fascinating aspects in astrophysics, especially for learners of all ages. Recently, thousands of exoplanets - with an increasing number of terrestrial ones - have been discovered. This is leading to the question, if some of them are fit for life.
Usually, the habitable zone of a star is synonymous with the area, in which liquid water may be found. This aspect has a very "earth-bound" point of view - there is no proof, that life without water is impossible. But a long-time stable atmosphere is one (of the many) essential keys for the evolution of life. This talk shows an estimation which allows to have a look at planets with different atmospheres surrounding stars with diverse luminosities and therefore diverse radiation pressures. If the radiation pressure predominates the gravity of a planet, the atmosphere cannot be stable for a long time. With the earth's atmosphere as a scale, one can assume, whether an atmosphere can exist long enough for the evolution of life or not.
This argument gives a lower limit for the necessary distance between star and planet fit for life. Most of the discovered exoplanets are quite close to their stars, caused by the methods of detection, so this estimation can be applied on a big part of them.