

The role of analogies and models in understanding a concept of phase transition

Katarina Susman, Sasa Ziherl, Jerneja Pavlin, Mojca Cepic

In physics education the analogies and mechanical models play important role. The survey among first and fourth year students of physics on Faculty of Education, University of Ljubljana, Slovenia was performed in study year 2010/2011. Through semi-structured interviews the information on students' concepts on phase transitions and structure of matter was achieved. Basic concepts and misconceptions are discussed in this contribution. The accompanying set of experiments was designed with a goal to improve the conceptions of phase transitions. They were performed during the physics classes among first year students of physics. Further on students were confronted with the mechanical model for phase transitions [1]. Students were asked to find the analogies between phase transition in water and mechanical model based on tension and/or compression spring. Their abilities of finding the parallels and their explanations will be presented. Some experiments and their relation to liquid crystals will be shown and tested during the presentation. Two examples are the undercooled water and the heating pad. The mechanical model for phase transitions [2], which allows for modeling the first and the second order transition as well as a dynamics close to the continuous phase transition is also presented and its use discussed in details as a part of the symposium.

[1] Susman, K., Pavlin, J., Ziherl, S.,

[2] Bobnar, J., Susman, K., Parsegian, V. A., Rand, P., Čepič, M., Podgornik, R. Euler strut : a mechanical analogy for dynamics in the vicinity of a critical point. *Eur. J. Phys.*, 2011, vol. 32, 1007-1018.

Contact information

Katarina Susman
University of Ljubljana
Faculty of Education
Slovenia
E-mail: katarina.susman@pef.uni-lj.si