GP 8: Closing Session

Time: Wednesday 16:30–18:00 Location: ELP 3: HS 2.33

GP 8.1 Wed 16:30 ELP 3: HS 2.33

Die andere Geschichte der Physik — •Grit Kalies[1] und Duong D. Do[2] — [1]HTW University of Applied Sciences, Dresden, Germany — [2]The University of Queensland, Brisbane, Australia

Die Entwicklung der modernen Physik wird nicht selten als Erfolgsgeschichte präsentiert, von der Mechanik, der kinetischen Gastheorie und der Elektrodynamik über die Relativitätstheorien, die Kopenhagener Deutung und die Higgs-Theorie bis hin zu den heutigen Standardmodellen der Teilchenphysik und Kosmologie und der Geometrodynamics, in der das Verhalten der Materie vollständig auf Geometrie reduziert wird. Es ist eine Geschichte physikalischer Theorien, die man auch "mathematische Phänomenologie" [1] nennen könnte. Zugleich gibt es eine Geschichte von physikalischen Größen, die geprägt ist durch unscharfe Begriffe und Mehrdeutigkeit, eine Vermischung von Kinematik und Dynamik und das Fehlen von Prozessgleichungen. Diese andere Geschichte wird erzählt anhand von Größen wie Kraft, Masse, Impuls, potentielle Energie, Ruheenergie, Entropie, Enthalpie und freie Enthalpie [2]. 1. E. Schatzman: Quantenphysik und Realität. Dtsch. Z. Philos. 2 (1954), 621-641; 2. G. Kalies, D. D. Do, AIP Adv. 13 (2023), 065121, 055317, 095322, 095126.

GP 8.2 Wed 17:00 ELP 3: HS 2.33

Albert Einstein, Alfred North Whitehead — •Christian Thomas Kohl — Freie Universität Berlin, Germany

Modern physics consists not only of new discoveries and inventions through relativity and through quantum physics. Modern physics has also produced new foundations and new ways of thinking, pointed out especially by Albert Einstein and Alfred North Whitehead. Modern physics has abandoned the cliché of black-and-white thinking, for which there are only separate things, without smooth transitions. Since Faraday and Maxwell, there has been a shift in the objects of study: since about 1850, the thought models of modern physics no longer revolve around separate, isolated bodies or building blocks floating in nothingness, but around the flexible webs of relationships between things and around the networks that surround things. Important clues to the modern ways of thinking about physics came from Albert Einstein (1879-1955) when he wrote about Faraday and Maxwell and the newness of physics in the last years of his life: *A courageous scientific imagination was needed to realize fully that not the behaviour of bodies, but the behaviour of something between them, that is, the field, may be essential for ordering and understanding events*.

GP 8.3 Wed 17:30 ELP 3: HS 2.33

Unclear crystals: 18th century projections of crystal formation — •Peter Heering — Europa-Universität Flensburg

"Which is beyond doubt one of the most pleasant observations that can be made with a solar microscope." With these words Wilhelm Friedrich Freiherr von Gleichen genannt von Rußwurm characterized the demonstration of crystallizations with a solar microscope. These projection microscopes were particularly popular in the second half of the 18th century. As I have already discussed, this popularity can be related to a significant degree to the instrument's ability of meeting the cultural standards of the Enlightenment. This understanding benefitted significantly from the practice with two original instruments at the Deutsches Museum. In the meantime, I had the opportunity of continuing to work with a reconstructed solar microscope - this enabled me to work on projecting the above mentioned crystallizations. In this talk I am going to present some of the experiences made in observing crystallisations, In doing so, I am facing a challenge that was already made explicit by the 18th century demonstrators: the projections with a solar microscope go 'beyond the expectation of those who have not seen it'.