

GP 4: Exploring the experimental approach

Time: Tuesday 16:30–18:30

Location: ELP 3: HS 2.33

Invited Talk GP 4.1 Tue 16:30 ELP 3: HS 2.33
Infusoria, Cress, and Tulips: Physical Experiments with Living Organisms — ●CATERINA SCHÜRCH — TU Berlin

This talk examines examples – from the mid-eighteenth century to the early twentieth century – of physicists using living organisms in their experiments. Not surprisingly, the decision to work with biological material required different justifications at different times. In the mid-eighteenth century, experimental physicists moved quite naturally from experiments with non-living material to experiments with organized bodies, whereas in the early twentieth century, working with biological systems was considered highly problematic. While prominent biologists suggested that there should be a biologist in every physics laboratory and a physicist in every biology laboratory, there was little interest among physicists in working with complex organisms that were difficult to control. Only in exceptional cases did it make sense for them to use living objects in their experiments. In the early decades of the nineteenth century, however, living animals and plants were still part of the physicist’s repertoire. Analyzing the debates about living organisms in physics experiments offers us a promising angle for exploring the changing methodological standards of experimental research in the physical sciences and beyond.

GP 4.2 Tue 17:30 ELP 3: HS 2.33
Trapping single particles - excluding the environment in experimental quantum optics, 1979 — ●ECKHARD WALLIS — Deutsches Museum, Munich

The trapping of single ions can be seen as one of the most ambitious attempts of excluding “the environment” from the study of atomic structure. The first observation of single trapped ions was achieved in 1979 by the group of Peter Toschek (1933-2020) in Heidelberg, in close

collaboration with the later Nobel laureate Hans Dehmelt (1922-2017) at University of Washington, Seattle. Techniques from particle trapping and laser cooling allowed them to control not only the number of atoms inside their trap but also the motion of the ion. This talk will study the motives behind the pursuit of single trapped ions: A “fundamental” line of argumentation linked the experiments to Ernst Mach’s opposition to atomism. However, unperturbed ions also promised useful applications in frequency metrology. The Deutsches Museum will present several artefacts related to this story in the new exhibition “Light and matter”.

GP 4.3 Tue 18:00 ELP 3: HS 2.33
Thomas Young’s Eriometer: a useful instrument and tool for Young, a failed instrument for everyone else — ●MICHELLE MERCIER — Europa-Universität Flensburg

Thomas Young (1773-1829) is best known today for his double-slit experiment. Almost unknown - even today - is an instrument that can be regarded as the first practical application of the results of his earlier investigations on diffraction and interference: the Eriometer. Young, a physician and physicist, claimed to be able to determine the diameter of homogenous samples of small particles and fibers with this instrument. In London, I was able to trace two Eriometers made by Young. One was part of a letter to Joseph Banks (1810). The other one is in the collection of the Royal Institution. Although experimental studies with a reconstruction of the instrument showed that measurements with a high degree of accuracy could be achieved, the instrument and the principle could not establish itself in England at the beginning of the 19th century. In this talk I will analyze the instrument from different perspectives and discuss possible factors for the rejection of the instrument in England at the beginning of the 19th century.