GP 10: Understanding tools from the recent past

Zeit: Mittwoch 11:15–14:00 Raum: HS 9

Hauptvortrag GP 10.1 Mi 11:15 HS 9

The computer as a tool of physics: how it all began - or not — •Arianna Borrelli — mecs, Leuphana University, Lüneburg, Germany

Today it is hard to find a branch of physics which can do without computers, but how did it all begin?

Historians of physics have so far not devoted much attention to how computers rose to the high status they now enjoy as a tool of physics, but case studies show that theirs was not the triumphal march one might assume a posteriori. After electronic programmable computers became available on the market in the 1950s, they were not always regarded as necessary tools by physicists, and their potential started being exploited only by individual scientists or groups in specific contexts, and not without resistance.

After a brief overview of recent research on the topic, I will present as an example of how computers entered physics a discussion of the search and acquisition of the first mainframe computer by CERN in the late 1950s. The study is based on the papers of Lew Kowarski, Director of Scientific and Technical Services at CERN since 1954. This material, preserved in the CERN Archive, provides information on the motives for acquiring a computer, on how Kowarski gathered information on the options available both from fellow physicists and from commercial firms, and on the final decision to acquire a Ferranti Mercury.

GP 10.2 Mi 12:00 HS 9

Films of Flows. The Film camera as a Tool in Fluid Dynamics. — •Mario Schulze and Sarine Waltenspül — Zürcher Hochschule der Künste, Zürich, Schweiz

In the course of the 20th century, a lot of research effort was put into scientific film, yet there has not been much historical research in that field so far. Concerning the film camera as tool of physics fundamental questions remain largely unanswered: What did physicists expect by using film cameras? Which obstacles had occurred before the film camera was recognized as a scientific instrument? In our contribution, we would like to start filling this void and examine what happened when, in the 1910s and 1920s, film was implemented in the field of fluid dynamics, at a time when photos were a common method to visualize flows. In particular, we focus on the first experiments with film by Ludwig Prandtl and his coworkers at renowned Göttingen Institute for fluid dynamics (Aerodynamische Versuchsanstalt der Kaiser Wilhelm Gesellschaft). The case of Göttingen shows that films just like photos occupied a precarious position between qualitative imaging and quantitative measurement. However, the film camera in particular was implemented only with a considerable unease regarding its publication, measurability and visuality before becoming a standard tool in fluid dynamics in the 1950s and 1960s. In our presentation we explore the epistemic potential of the film camera and discuss why film produced this unease and why nonetheless so much effort was put into its use.

GP 10.3 Mi 12:30 HS 9

Narratives from the trading zone: Nonlinear dynamics and non-equilibrium thermodynamics in oral history interviews and textbooks — •Caroline Bauer — Lehrstuhl für Wissenschaftsgeschichte, Universität Regensburg

In 1988 James Gleick published the widely sold popular science book "Chaos - Making a new science". Quoting from interviews with nearly one hundred, mostly Western scientists, he delivers a narrative of nonlinear dynamics and non-equilibrium thermodynamics that has individual pioneers fighting the old paradigms and boundaries of their disciplines, bringing about a new scientific revolution. This narrative has also been used by the Bielefeld Universitätsschwerpunkt Wissenschaftsforschung in 1990/91 for their history of self-organization.

In my master's thesis I am contrasting this narrative twofold: One, with an analysis of semi-structured oral history interviews conducted with the keynote speakers at the 2017 Dynamics Days Conference in Szeged, Hungary. Drawing on Peter Galison's *trading zone*, I am focusing on how they place themselves and their (past) colleagues within or outside their affiliated discipline, and how they present the communication with members of other disciplines. Two, I will analyze the framing and the disciplinary reduction processes (*pidginization*), as a specific problem – the Belousov-Zhabotinsky reaction – is presented in nonlinear dynamics and non-equilibrium thermodynamics textbooks for different audiences. With this approach I aim at contributing to answer how the field has maintained its fluid state until the present.

60 min. lunch break