

Physics with Industry

21-25 November 2022 @Oort

The Physics with Industry workshop took place at the Lorentz Center in Leiden between the 21st and 25th of November. This was the 12th edition, - as always organized by a collaboration of NWO and the Lorentz Center. This year, four teams worked on four real-world industrial problems for five consecutive days. Each team included nine young researchers (PhD's and Postdocs), an academic mentor and representatives of the participating companies. The industrial participants were a mix of large companies and SMEs. The workshop included a site-visit by the PhD and Postdoc researchers at the companies on the 17th and 18th of November, as a preparation for the workshop week.

The four company cases were selected by a scientific committee of five senior academic researchers in the field of physics from different universities and institutes in the Netherlands. This year, the participating cases and companies were: Design ASML's next generation tool for 1 nm semiconductor node (**ASML**), Eavesdrop on Seeds (**BejoZaden**), Concept development of an optical monitoring system for journal bearings in Wind Turbine and Marine applications (**Sensing360**), Removal of unwanted particles/bubbles in liquid steel by using an injected electric current (**TataSteel**).

The four different cases represent a very broad research area of physics in which most of the PhD and Postdoc researches would fit in with their backgrounds. The teams worked very hard during the workshop week and came up with original ideas and solutions. The Sensing360 group, for instance, came up with the idea of ultrasound scanning, which allows for measurement of the shaft-housing distance in journal bearings under operation. The TataSteel group proposed a steelfall with external magnetic field as a solution to their problem. All results of the workshop week were summarized in proceedings, which will shortly become available on the NWO website.

The schedule during the week was as follows: On Monday, the workshop week started with a plenary presentation session where the four different companies introduced the cases. After that, the four teams retreated to separate rooms and worked on the different cases. On Wednesday, there was a plenary midterm presentation session, where the groups could show their ideas and proceedings. After the presentations, there was room for discussion and feedback, which the groups could use for their final two days. On Friday, all groups gave a final presentation in which they showed their solution to the problems. These presentations were evaluated by the scientific committee, who were physically present at the Lorentz Center. The group working on the Sensing360 case was awarded the first prize and is invited to present their results at the national conference NWO Physics in April. This is the third time the winners get invited to NWO Physics, with the aim to expand the workshops visibility among the Physics community.

The workshop has been held at the Lorentz Center since 2010, which has led to a rather standardized format throughout the years. In collaboration with the Lorentz Center, we decided on the format of plenary presentation sessions on Monday morning, Wednesday morning and Friday morning and separate group "brainstorming sessions" during the rest of the week. A change compared to the last edition is that NWO has written an article about the workshop, which will be published in the "Nederlands tijdschrift voor de Natuurkunde", with the aim to further expand the workshops visibility.

At the end of the workshop week, NWO asks all participants to fill in an evaluation, based on questions asked in a Mentimeter. This allows to get more data (virtually everyone gets involved; evaluations sent by e-mail usually have lower responses), quickly (participants submit their reply on the spot) and still guarantees a level of anonymity, while by choosing the right questions it is possible to follow which team experience what. Based on the outcome of this evaluation, it is clear that most participants had a very positive experience. Especially, the main goals of the workshop, to expose young physicists to the company world and to expand their knowledge and networks, were successfully met.

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