

Report on the 7th European Course of Cryogenics

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The European Course of Cryogenics was held August 24-September 13. Based on an agreement among three technical universities—Dresden, Germany; Wrocław, Poland and Trondheim, Norway—the course is an elective subject in each school's engineering curriculum, offering a maximum of 12 ECTS credits to students successfully passing the final written exams.



Full-day lessons, tutorials, exercises and excursions were held on three consecutive weeks and served 43 students. The Dresden course focused on basics and hydrogen technology; the Wrocław week focused on helium and the Trondheim course focused on LNG.

This was the seventh iteration of a course originally initiated in 2008 by Professor Hans Quack, who has retired but is still very active. This year's course was organized by Christoph Haberstroh, Thomas Funke and Marcel Klaus from Dresden; Agnieszka Piotrowska from Professor Maciej Chorowski's group in Wrocław, and Zhequan Jin and Professor Arne Bredeesen at NTNU Trondheim.

Once again the course was completely booked, with a long waiting list. Besides students from the three hosting universities, registration was open to students from other European cryogenic institutes, including those from Russia, Prague, Milan, Manchester, Lisbon, Madrid, France and Karlsruhe. Since students were handpicked by their respective institutions, the level of academic background and motivation among participants was quite high.

Corporate sponsors helped cover the costs of hosting, local transport, special events and development of basic program framework. They included Linde Kryotechnik; WEKA; the oil and gas company PGNiG, KrioSystem and Creator in Poland; and SINTEF and Statoil ASA in Trondheim. Sponsoring in exchange for registration of an entry-level cryogenic engineer were Cryotherm, Schwanner and Criotec Impianti SRL.

Once again several prominent lecturers volunteered to teach the course along with the staff of the three sponsoring universities. These included Prof. Aldo Belloni, CEO Linde Munich; Klaus Ohlig, head of Linde Kryotechnik; Johannes Toepler, head of the German Hydrogen Association. John Weisend II from ESS in Lund, Sweden, contributed chapters on cryostat design and instrumentation, and Philippe Lebun from CERN taught on the subject of large-scale cryogenic applications and safety constraints. Andrea Raccanelli covered technology and cooling below 1K and major contributions on helium and on LNG technology were made by Vaclav Chrz, IIR, Chart Industries, Decin, Czech Republic. SINTEF and Statoil ASA provided several lectures at Trondheim.

These teachers' visible enthusiasm for professional work in cryogenics was transferred to the students, inspiring them toward further dedication in the field. While the course primarily offered participants extensive theoretical and practical knowledge, it also provided useful networking opportunities among participants and their institutions, as well as the sponsors and lecturers. The course already has resulted in a number of applications for internships and a decision on a master's thesis. Experiencing unusually good weather, the course was topped with the very rare spectacle of fulminant Northern Lights on the concluding night in Trondheim.



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