

Accelerating Learning

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[Accelerator beam patient monitoring](#)

Summer events held at CERN boost knowledge and collaboration. The events were coordinated by the QUASAR Group.



The Optimisation of Medical Accelerators ([OMA](#)) and Accelerators Validating Antimatter physics ([AVA](#)) projects organised several training events this summer at the fascinating research environment of CERN. The events were coordinated by the Quantum Systems and Accelerator Research ([QUASAR](#)) Group from the [University of Liverpool](#), based at the [Cockcroft Institute](#). The Group has a unique track record in organising international

training events and has organised more than 50 Schools and Topical Workshops for the accelerator community over the past decade.

The [OMA](#) project held its 2nd Topical Workshop on 'Diagnostics for Beam and Patient Monitoring' at CERN on 4-5 June. Over 40 delegates attended the two-day event. The workshop brought together experts specialised in monitoring patients with those developing technologies for imaging the particle beam used for the treatment to address some challenging questions in ion beam therapy. It identified common challenges and synergies between both communities.



2nd OMA Topical Workshop
Diagnostics for Beam and Patient Monitoring
4th - 5th June 2018, CERN



Fig.1: Participants at the 2nd OMA Topical Workshop. (Credit: QUASAR Group)

The [programme](#) included a mix of invited and contributed talks. Technologies for non-invasive particle beam imaging were presented, as well as innovations based on prompt gamma imaging and associated simulation techniques.

Lectures given by leading researchers linked R&D with state-of-the-art clinical treatments. Several industry talks gave insight into the latest developments in clinical hadron therapy. Along the main workshop topic there was also a session on knowledge exchange, discussing how expertise at CERN and in wider research can be developed into partnerships with Industry.

All talks can be accessed via the following link: <https://indico.cern.ch/event/716062>

The workshop was followed by an [academy](#) organised by [COSYLAB](#), from 6-8 June 2018, specifically for the OMA Fellows. This hands-on event introduced them to a control system

architecture widely used in research institutes and proton treatment facilities across the world.



Fig.2: OMA Fellows at the COSYLAB academy. (Credit: QUASAR Group)

The participants received training in EPICS control software. This is a software developed by a collaboration that shares designs, software tools, and expertise for implementing large-scale control systems.

This training was a good opportunity to better understand the interface between diagnostic devices and their integration into the control system of a large-scale research facility.

Defining new training standards in antimatter research is the declared goal of AVA. AVA's training programme is paramount as "Antimatter research boldly goes towards Physics Final frontier", says [Professor Carsten P Welsch](#), AVA Coordinator.



Fig. 3: Participants at the AVA School. (Credit: QUASAR Group)

AVA's latest training event was an International School on 'Low Energy Antimatter Physics', attended by more than 60 participants. This international event took place over 5 days at CERN from 25-29 June 2018.

The week's activities included lectures from experts working at the Antiproton Decelerator (AD). They covered the fundamentals of accelerator design and operation, invasive and non-invasive diagnostic techniques, spectroscopy measurements, antimatter gravity studies, as well as electron cooling. Study sessions were in place to allow follow-up discussions and encourage the attendees to ask questions



Fig.4 : AVA Fellows discussing with Dr Gerard Tranquille, one of the lecturers at the AVA School. (Credit: Indrajeet Prasad)

One seminar by Professor Hubert Reeves, a well-known science communicator, was organised in CERN's Globe of Science and Innovation and was open to the general public. It was a great success with all of the 250 places booked and can now be watched via the event webpage in [French](#) or [English](#).

In addition to lectures and seminars, the attendees also received tours around CERN's unique AD and Synchro Cyclotron (SC) facilities, enabling them to see accelerators first-hand. A poster session encouraged networking and allowed for one to one discussions with other researchers.

Companies involved in AVA presented the particular research challenges they have been facing in a dedicated industry sessions. This gave School participants a better insight into how cutting-edge R&D is carried out in different sectors.

"Research within AVA has the potential to open up an entirely new realm of unseen Physics. Our School provided an excellent overview of the numerous challenges this community is currently facing and was an excellent addition to the long list of international training events we have organized over the years.", says Professor Welsch.

All talks given during the School can be accessed via the following link:

<https://indico.cern.ch/event/677170/>

The School was followed by [hands-on training days](#) on Detectors and Beam Diagnostics

offered by [Stahl Electronics](#) and [Bergoz Instrumentation](#), respectively. These bespoke trainings allowed Fellows to build up a deep understanding of cutting edge detector technology and obtain hands-on experience in working with them.



Fig.5 : AVA Fellows during training day with Stahl Electronics. (Credit: Indrajeet Prasad)
These summer trainings have set high standards for future events. The various contributions of industry partners ensured that participants received insight into both academic and industry aspects.

A [project video](#), produced by the AVA Fellows during a bespoke [Media Training](#) earlier this year, is only one example of successful industry-academia collaboration.

The majority of the workshops and schools organised by the training networks are open for external participants. To learn more about upcoming events, please visit the [AVA](#) and [OMA](#) webpages or follow the [QUASAR Group's Twitter channel](#).