

# Palestinian Advanced Physics School 2016

Arab-American University, Jenin, July 26-28, 2016

Organised by Scientists for Palestine

Palestine places a very high value on education, with over 25% of 18-24 year olds enrolled in university, 10% higher than the average in the Arab region. Half of all students are women, a ratio that is among the highest in the world. Despite this, the development of the sciences in general and physics in particular in Palestine has been stifled by a number of factors. Many problems and hardships are a consequence of the ongoing and internationally denounced occupation of the West Bank and Gaza, causing strong restrictions on mobility of students and academics. Nevertheless, the demand for a high-level exchange with the international scientific community has been growing rapidly in recent years: for example, Palestine has recently signed a cooperation agreement with CERN, the world's leading particle physics laboratory.

To address the need for further scientific exchange, the newly founded international group Scientists for Palestine organised the first Palestinian Advanced Physics School (PAPS) with financial support from CERN and the Sharing Knowledge Foundation. The school took place on July 26-28, 2016 at the Arab American University in Jenin in the West Bank. During the school thirty Masters students from different institutions within Palestine attended lectures on different topics in contemporary physics from internationally renowned scientists.

The school consisted of three courses of lectures. Professor John Ellis (of King's College London and CERN) provided an introduction to the Standard Model of particle physics and its extensions, ideas that are currently being probed at CERN. Professor Philip Argyres (of the University of Cincinnati) taught a course on the ideas of symmetry and symmetry breaking, key concepts that are used throughout many areas of physics. Finally, Professor Giorgio Paolucci of SESAME – the synchrotron light source located in Jordan – lectured on the physics and applications of synchrotron radiation, with a focus on the physics studied at SESAME.

The school generated an interactive and vibrant environment which inspired students to take small research initiatives on their own. In addition to formal lectures, students took part in smaller discussion sessions on the lecture material, each led by a member of the organizing committee. They also performed a hands-on computer activity, testing their newly acquired particle physics knowledge by analyzing simulated collision data from the CERN experiment. In the evenings, before social dinners provided by the school, students solved problem sets on the lecture material, which they handed in to receive a certificate at the end of the school. A session on life in academia, aimed at helping interested students secure PhD positions abroad and streamlining for them the details of the involved PhD application process, closed the program.



Philip Argyres (left) and John Ellis (right) lecturing at PAPS 2016.

Students attended from the four universities in the West Bank that offer Masters programs in physics: Birzeit University, Al-Quds University, An-Najah University, and the host university of the Arab American University in Jenin. All of the students at the school were motivated and enthusiastic. When interviewed regarding the school, one of the students, Falastine Abu Saif (of An-Najah University) commented, "In one word

*the school is very cool! It is great to hear lectures directly from world experts and connect with them...Palestine needs more and more connections with the rest of the world. We have plenty of potential, and very smart people. We just need more support and encouragement".* Fellow participant Waad Awad (of Birzeit University) said that, *"Being at the first Palestinian Advanced Physics School was a wonderful experience. The lectures were helpful and interesting. We feel lucky to have such a chance to improve our physics knowledge, meeting scientists from all over the world."*



Students of PAPS 2016 working on a computer exercise.

In the student evaluation forms, filled at the end of the school, the students consistently expressed tremendous enthusiasm, giving the school the highest possible overall rating and remarking that it was not only an educational but also inspiring experience. This does not mean, however, that there was no room for improvement. A clear demand emerged for a longer school, with a minimum length of five days, covering a broader range of topics, in particular various aspects of condensed matter physics and cosmology.

Unfortunately, not all admitted students were able to attend the school: a highly merited student from Gaza was not granted permission by the occupation to travel to Jenin. Article 26 of the Universal Declaration of Human Rights, adopted by the UN General Assembly in 1948, states "[H]igher education shall be equally accessible to all on the basis of merit". It is regrettable that this student's right to education has been violated in this case.

Overall, the school was a great success. The students' performance on the problem sets and during the discussion sessions was particularly impressive, demonstrating that they had obtained a healthy command over the material.

Encouraged by the success of the school, Scientists for Palestine intends to make PAPS a recurring event. In particular, we are currently organizing PAPS 2017, to be held at Al-Quds University in Jerusalem in the summer of 2017. Following student desires – and contingent on secured funding – PAPS 2017 will be longer (five days rather than three) and have a different focus, on condensed matter physics and cosmology rather than high-energy physics.

Scientific education and research in Palestine continues to grow and connect in new ways to the international scientific community. Scientists for Palestine hopes that PAPS will play a key role in that process.

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