ANSTO interview: Nikolas Paneras

**Questions are key**

### About this interview

Watch this interview with Nikolas Paneras as the range of particle accelerators used to support research along with their operation. He will also outline how they are tuned to suit research needs and highlight the importance of maintaining them to ensure optimum operating characteristics

This interview would be relevant for HSC Physics students and supports both Module 6: Electromagnetism and Module 8: From the Universe to the atom.

### Syllabus links

Physics inquiry questions

* Why do objects move in circles?
* What happens to stationary and moving charged particles when they interact with an electric or magnetic field?
* How is it known that human understanding of matter is still incomplete?

Investigating Science inquiry questions

* How have developments in technology led to advances in scientific theories and laws that, in turn, drive the need for further developments in technology?
* Why is scientific research regulated?

### In the classroom

Accelerator mass spectroscopy (AMS) applies principles of circular motion and electromagnetism in order to separate charged particles based on differences in their masses. It could be used as a context for problem solving in which students investigate the different radii of curvature for carbon isotopes as they pass through the bending magnets.

Accelerator operation is part of the final inquiry question in Module 8. The principles of accelerating particles with electric fields and manipulating their direction using magnetic fields is explored in this interview. Students could summarise these examples, researching details of the magnetic and electric fields typically used in these accelerators and comparing them to those used in the LHC.

### Further reading

* [Meet an Expert Videoconferences](https://www.ansto.gov.au/education/secondary/videoconferences/meet-an-expert): Choose a research topic and interview one of ANSTO's scientists
* [ANSTO education workbooks](https://www.ansto.gov.au/education/secondary/workbooks)  
  ANSTO has developed a range of learning resources to support students studying Physics, Chemistry and Investigating Science.
* [ANSTO – Data sets](https://www.ansto.gov.au/education/resources/data-sets)  
  A collection of research data for use in the classroom. The resources are scaffolded to support student use and cover a range of topics.
* <http://physics.bu.edu/~duffy/HTML5/cyclotron.html> cc licence animation (change mag field and electric field Andrew Duffy

### Acknowledgements

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